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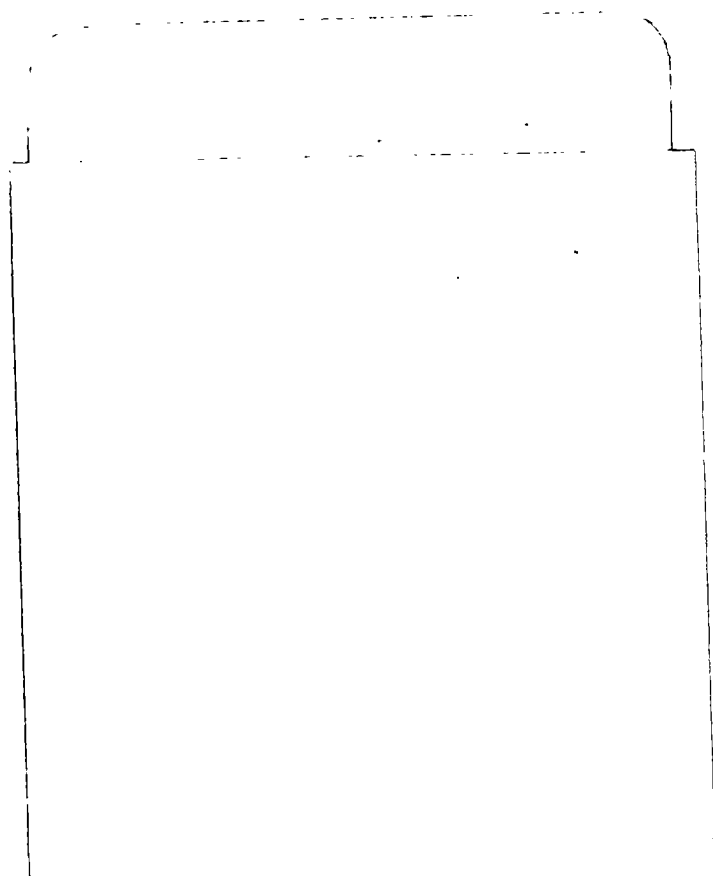
FIELD MANUAL

**SURVEILLANCE, TARGET ACQUISITION AND
NIGHT OBSERVATION (STANO) OPERATIONS**

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HEADQUARTERS, DEPARTMENT OF THE ARMY

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FIELD MANUAL

No. 31-100 (TEST)

HEADQUARTERS
DEPARTMENT OF THE ARMY
WASHINGTON, D.C., 20 May 1971**SURVEILLANCE, TARGET ACQUISITION AND NIGHT OBSERVATION
(STANO) OPERATIONS**

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CHAPTER 1

INTRODUCTION TO STANO OPERATIONS

Section I. GENERAL

1-1. Purpose

a. The purpose of this manual is to provide the guidance required for the tactical planning, employment, and management of surveillance, target acquisition, and night observation (STANO) systems at division and lower echelons.

b. STANO is an element of the Intelligence Subsystem of the Integrated Battlefield Control System (IBCS). The IBCS is the structural framework of personnel, organizations, concepts, doctrine and equipment integrating the functions of combat into a coherent system. The STANO element of the Intelligence Subsystem consists of the organizations, personnel and equipment utilized in performing reconnaissance, surveillance and target acquisition missions.

c. This document is a field manual (Test) as defined in AR 310-3.

1-2. Scope

This manual provides basic techniques and proce-

dures concerning information-collection activities, both ground and aerial, involving the employment of the STANO systems. This manual addresses general war, limited war, and cold war situations to include stability operations in both nuclear and nonnuclear warfare environments during the 1971-75 time frame. It offers guidance for the employment of STANO equipment designed to improve the general detection, identification, and location of enemy forces during periods of limited/reduced visibility. This manual is based on field experience which includes combat experience and, in some instances, on supporting data derived from STANO tests. New and improved STANO materiel and signal intelligence and electronic warfare support measures (SIGINT and ESM) are continually being developed to enhance the Army's capability to fight in any environment. As the capabilities of the STANO equipment described herein are modified and improved, commanders must integrate the added capabilities with the tactics and techniques necessary to fully exploit these improvements.

Section II. STANO WITHIN THE IBCS

1-3. General

a. The overall goal of the Integrated Battlefield Control System (IBCS) is to enhance the Army's combat effectiveness on the battlefield. The purpose of the IBCS is to aid the commander in making more rapid, accurate, timely, and considered decisions, to aid him in choosing the best alternative, and to insure more effective and timely responses on the part of the subordinate elements. There are four subsystems within the IBCS: The Commander's Integrating Subsystem, the Intelligence Subsystem, the Operations Subsystem and the Support Subsystem. (See fig 1-1.)

b. Surveillance, Target Acquisition and Night Observation (STANO) is one of the principal components of the Intelligence Subsystem of the

IBCS. It is comprised of those means and materiel organic to or in support of the Army in the field associated with information gathering and presentation capabilities utilized to locate the enemy. More specifically, the STANO component consists of the organizations, personnel, and equipment utilized in performing reconnaissance, surveillance, and target acquisition missions.

c. STANO can thus be viewed as a finite entity so far as definition is concerned. STANO organizations, personnel, and equipment are integrated throughout the field army structure.

1-4. The Intelligence Subsystem

a. The Intelligence Subsystem of the IBCS interfaces with the Operations and Support Subsys-

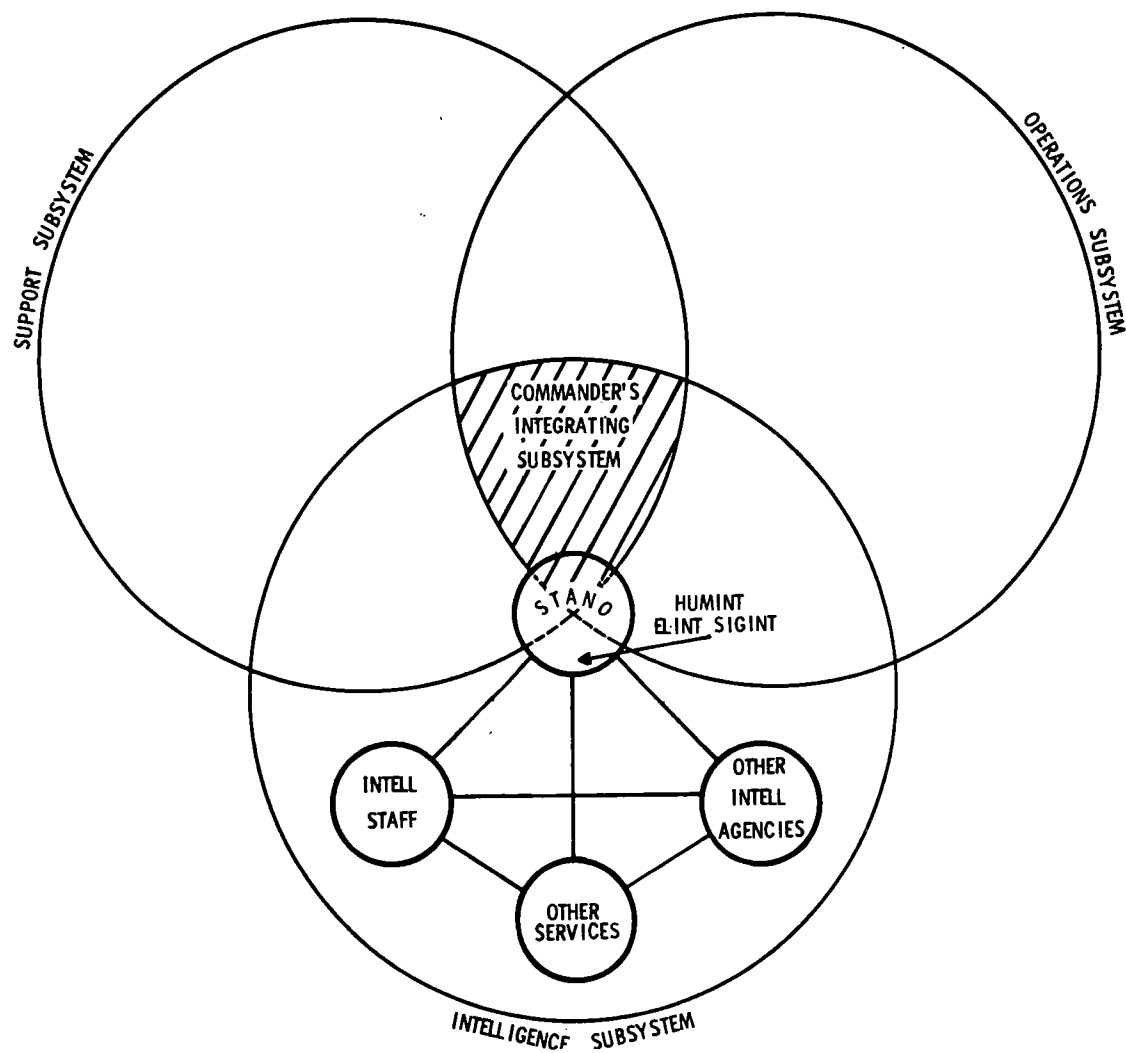


Figure 1-1. Integrated battlefield control system. (To be published)

tems at its own level of command and with the Intelligence Subsystems of adjacent or supporting units as appropriate. The Intelligence Subsystem provides the means by which items of information may be compared with previously received information and stored historical data in order to determine, more accurately, enemy courses of action. It provides a means for rapid coordination of all elements that produce and process information pertaining to the enemy, terrain, weather, and related factors. It makes provision for timely information flow to the lowest commander responsible for the area to which the information applies. Emphasis on meeting these intelligence needs is from front to rear. The Intelligence Subsystem integrates operations involving the collection of information concerning the enemy, and the continuous production of useful intelligence for the commander.

b. Within the Intelligence Subsystem, components and elements such as STANO, SIGINT, and human resources collective activities (HUMINT), as well as other Service and civilian intelligence agencies are integrated to optimize the capabilities of all components and elements. The Intelligence Subsystem is designed to maintain a smooth flow of Intelligence matters between and among each component and element of the subsystem.

1-5. Battlefield Information Control Center/ Battlefield Information Center (BICC/BIC)

a. The Intelligence Subsystem collects information from all component sources, processes the information and disseminates it to the other subsystems of the IBCS. Under present conditions, the information collection capability exceeds the ability of the Intelligence Subsystem to process and disseminate the collected data. This does not allow all of the acquired data to be of immediate use to the other IBCS subsystems.

b. To insure the most efficient use of all collection means and to prevent unnecessary duplication of effort, all collection activities will be coordinated by a central element at each command echelon from maneuver battalion through corps. This central element, known as the battlefield information control center (BICC), in addition to tasking for and coordinating the collection effort will insure the expeditious handling of the collected information. The data handling function is of equal importance to the management of the collection effort. The BICC will be aware of the

deployment of all collection means organic to or supporting its echelon. To coordinate and schedule the collection effort, the BICC must be able to integrate the information collected from all sources. Control or tasking of all means organic to or supporting a particular echelon will be centralized at that echelon.

c. The central facility supporting the field artillery battalion, division artillery, and armored cavalry units, has been designated the battlefield information center (BIC). It differs from the BICC in that it does not control the collection resources of the supported units. Target acquisition devices that are an integral part of the artillery weapons system will be employed by the appropriate artillery commander. However, the use of these means is coordinated with and integrated into the force's total collection effort. Since reconnaissance is a primary responsibility of armored cavalry units, the unit commander controls and coordinates this combat intelligence collection effort as a major responsibility.

1-6. The STANO Component

a. STANO capabilities will be found throughout the field army structure down to the lowest echelon. A STANO organization is a unit with a primary or collateral operational mission for gathering and presenting information needed to locate the enemy. All maneuver elements have a STANO mission. Personnel considered within the STANO component are those personnel who primarily serve non-STANO functions but have a STANO-related function, such as the basic infantryman, and personnel with dedicated STANO military occupational specialties (MOS) which, in most cases, require special MOS training, such as field artillery target acquisition radar operators.

b. Within the field army, there are many types of STANO and STANO-related equipment available to meet the commander's requirements for information of the enemy. Each type of equipment has characteristic capabilities and limitations which determine the conditions under which it functions most effectively. No single type of STANO equipment can satisfy all of a commander's information needs. Neither can a single type function effectively in all operational and physical environments. It is, therefore, necessary to employ a balanced combination of available means to insure adequate coverage of the battlefield and a high reliability of the collected data. STANO materiel can be found at all echelons throughout the field army structure.

c. Since STANO devices represent only one part of the intelligence gathering resources of the commander, they must be considered in the context of the overall capability the commander must have to effectively control the battlefield. The operational STANO component consists of the total family of airborne and ground sensors, as well as patrols, observers, civilian intelligence agencies, etc., employed by the Army for surveillance, reconnaissance, target acquisition and night observation. By the use of newly developed STANO capabilities, commanders can observe areas without physical occupancy; an economy of force consideration. The employment of STANO capabilities applies to all levels of command; therefore, efforts at each echelon should be coordinated with higher, lower and adjacent elements to insure that efficient utilization is made of available STANO assets. Commanders having the need for information which is not available from within his organic resources must request support from higher echelons or other Services.

d. Within the IBCS, the Intelligence Subsystem consists of the STANO capabilities, other intelligence information sources, communications, and data links for transmission of intelligence information; facilities for processing intelligence and operational data, and readout and display equipment to facilitate analysis and subsequent input to the Commanders Integrating Subsystem (CIS)

and other users. The objective of the Intelligence Subsystem is to provide commanders, at all levels, the capability to find the enemy, observe his activities, process the data and disseminate the intelligence on a continuous, real or near real time basis under all environmental conditions and in all types of warfare.

e. The STANO component interfaces with the Intelligence Subsystem through the intelligence staff at each level of command. The intelligence staff assisted by the BICC/BIC is the central collection point for all information obtained from the various information gathering components at each level of command. The BICC/BIC, in turn, help expedite the processing and dissemination of collected data, within the Intelligence Subsystem, to the other subsystems of the IBCS. The BICC/BIC provide for the target development process by tasking collection means and providing for a continuous flow of information between the various components to insure higher reliability in the information collection process and to avoid unnecessary duplication of effort.

f. The improved utilization of existing STANO assets and the integration of new STANO assets will result in an improved acquisition and collection effort within the STANO component through higher reliability and more complete information of the enemy.

Section III. STANO OPERATIONS

1-7. STANO Objectives

STANO operations are conducted continuously. The objectives of STANO are to assist the commander in his efforts to:

a. Attain the initiative by detecting, identifying, and locating the enemy.

b. Make contact with the enemy at a chosen time, under the most favorable conditions, and to maintain this contact.

c. Expedite dissemination of target intelligence in order to increase effectiveness.

d. Counter or neutralize the enemy's plans for fire and maneuver.

e. Improve the effectiveness of command and control of combat forces in all weather conditions in various climates throughout the world.

f. Achieve economy-of-force operations by increasing the surveillance and target acquisition capabilities of all echelons.

1-8. Terminology

A glossary of STANO terminology is included in this text. In addition, terms which are repeatedly used in this manual are explained as necessary.

1-9. Equipment Appendix

Due to the variety and magnitude of STANO materiel used in STANO operations, an equipment appendix (app B) which describes selected items of equipment or devices is included. These devices and equipment are representative of technologies currently existing and do not necessarily depict size, shape, or name which may be associated with the materiel in the future. See the index for a list of this equipment.

1-10. Recommended Changes

Users of this manual should submit recommended changes and comments to improve the manual. Comments should be keyed to the specific page,

paragraph, and line of the text in which change is recommended. Reasons will be provided for each comment to insure understanding and complete evaluation. Comments should be prepared using DA Form 2028 (Recommended Changes to Publications) and forwarded direct to the Commanding General, U.S. Army Combat Developments Command, Intelligence and Control Systems Group,

ATTN: CDCCD-P, Fort Belvoir, Virginia 22060. Originators of proposed changes that would constitute a significant modification of approved doctrine may send an information copy, through command channels, to the Commanding General, U.S. Army Combat Developments Command, Fort Belvoir, Virginia 22060, to facilitate review and followup.



CHAPTER 2

THE NEED FOR STANO

Section I. INTRODUCTION

2-1. Introduction

a. From time immemorial, commanders have faced the need for timely, accurate, and detailed knowledge of terrain and of the disposition of the opposing force. Since World War II, the increased effectiveness of firepower, coupled with the rapid mobility furnished by air and ground vehicles, has caused greater and greater dispersion of combat units both laterally and in depth. The commander's area of interest has increased. His requirement to be able to provide complete, constant, and thorough surveillance is more critical. His need to rapidly convert raw data into decision-oriented and target intelligence has been accelerated.

b. STANO systems assist the commander's intelligence gathering requirements. They comprise those means and materiel organic to or in support of the Army in the field (to include the other Services) which are associated with the gathering and presentation of information about the enemy. Included in STANO are items which extend daylight capabilities to night operations. STANO systems employ both ground and aerial surveillance means to include visual observation, thermal imagery, infrared, image intensification, radar, unattended ground sensors, and photographic equipment.

c. This chapter outlines the use of STANO systems in intelligence gathering operations especially at division and lower echelons. It discusses hypothetical, yet typical enemy situations and operations toward which intelligence personnel can direct the intelligence information collection effort. These hypothetical enemy situations are based on aggressor tactics and techniques as outlined in FM 30-102 (Handbook of Aggressor Military Forces).

2-2. General War

a. General.

(1) *Description.* General war in either a nu-

clear or nonnuclear situation is characterized by limited or unlimited conflict against an enemy whose equipment may vary from the most sophisticated available, to World War II level technology. Operations under such conditions will stress the use of conventional military forces.

(2) *Basic enemy tactical doctrine.*

(a) Potential hostile enemy forces possess modern, highly mechanized and well-balanced fighting forces. His tactics emphasize surprise, speed and dispersion while retaining the form of conventional tactics. These, in turn, are a blend of the envelopment, in its several variations, and rapid, deep armor penetration.

(b) Standard procedure when advancing is to bypass or envelop strongly held points or areas. Only when a strongly defended area has no readily assailable flanks will enemy use their breakthrough tactics, and then they tailor the force to the estimated resistance.

(c) As a part of the effort to accelerate operations and to avoid presenting lucrative targets for nuclear weapons, his doctrine emphasizes speed in overcoming natural and manmade obstacles, such as rivers and artificial obstructions. The enemy attempts to cross water barriers in stride, without interrupting the momentum of advance by halting for a build-up. Where heavy defenses require a concentration of force, he minimizes the presentation of a target by rapid assembly from dispersal areas in order to launch a surprise assault at the point of main effort. He will then continue the advance on a broad front after enemy defenses are breached. Enemy commanders normally will assemble a task force which will give them a high probability of success. Usually this will consist of at least a three to one ratio of combat power over his opponent at the point where a decision is desired.

(d) The predominant tenet of enemy tactical doctrine is that decisive results are achieved only through offensive action. He, however, recognizes the defense as a necessary form of combat

which at times might be profitably adopted to gain time while awaiting the opportunity to resume offensive action. He may also use economy-of-force measures in an area in which an immediate decision is not being sought, to enable him to use a greater force in another area. When circumstances force an enemy commander to assume a defensive posture, he is expected to seek every opportunity to seize the initiative and resume the offensive.

(e) His doctrine states that seizing and maintaining the initiative is an indispensable ingredient of success in battle. Great emphasis is also placed on the achievement of surprise as a means of shifting the balance of combat in his favor. Commanders are expected to seize every opportunity to strike the enemy when, where, and in a manner for which he is unprepared. It is not essential, the enemy feels, for the opponent to be taken unaware, but only that he become aware too late to react effectively.

(3) *Intelligence indicators of enemy activities.* In spite of all precautions taken to deceive an

opponent about his probable courses of action, the enemy eventually must carry out specific activities in preparation for or in conjunction with specific actions. Some of these activities may be essential to the intended action, others may be dictated by the concept of tactics peculiar to his military thinking. In many cases, these activities can be detected by STANO means, and when properly evaluated and interpreted will lead to the development of a reasonable estimate of the enemy's probable courses of action. Care must always be taken not to be deceived by enemy measures designed to mislead intelligence operations.

b. *Attack.* An enemy attack will be indicated by certain intelligence indicators. The chart below contains a listing of general types of STANO means followed by representative specific items of STANO equipment. Each general type is keyed to an intelligence indicator and an explanation of that activity. (The list of intelligence activities is by no means complete but is meant to serve as a sampling of indications of typical enemy activities.)

<i>STANO means</i>	<i>Friendly</i>	<i>Specific example</i>
(1) Aerial Photography Airborne Radar Sensors		KS-100 Camera SLAR Air-Delivered Seismic Intrusion Detector (ADSID).
(2) Night Vision Devices Gnd Surv Radar Direct Illumination Sensors		Starlight Scope PPS-5 Flares Alarm Set, Anti-Intrusion Restricted Area (MINISID).

<i>Activity</i>	<i>Enemy</i>	<i>Explanation</i>
Concentration of mass toward either or both flanks.	Single or double envelopment normally is attempted in the offense. Tanks and mechanized units on either or both flanks may indicate single or double envelopment.	
Massing of mechanized elements, tanks, artillery, and logistical support.	Areas of secondary importance are often denuded to mass maximum strength for main effort.	
Deployment of combat elements (mechanized, armor, antitank) in echelon.	Normal attack formation provides for the second echelon of the regiment to be located 3-6 kilometers in rear of the first echelon on line; division second echelon 6-8 kilometers in the rear of first echelon; and army second echelon 15-25 kilometers in rear of first echelons.	
Movement of hostile units forward.	Prior to launching an attack, troops may be moved to assembly areas from which they can deploy.	
Artillery positions well forward and concentrated.	Artillery positions for the attack are well forward, with direct fire weapons, artillery pieces, and large numbers of mortars concentrated.	
Medium air defense guns located in forward areas.	Medium air defense guns displaced forward prior to attack to protect assault forces and to facilitate forward displacement during the attack.	
Conducting drills and rehearsals in rear areas.	Major attacks may be preceded by rehearsals. This is particularly true of attacks against fortified positions or strongly defended river lines.	
Increased activity in rear areas	Before an attack, supply and administrative activities increase in the rear areas.	
Location of supply and evacuation installations well forward.	Supply and evacuation installations usually are located well forward for an attack.	
Clearing lanes through obstacles within own position.	Lanes are cleared and marked through mined areas, ramps and bridges prepared over ditches and trenches within enemy's own position. This is done prior to attack to facilitate forward movement and grouping, particularly at night.	
Reconnaissance and destruction of obstacles that are part of opponent's defenses.	Usually on night preceding attack, enemy patrols reconnoiter opponent obstacle to determine plan for clearing lanes. Patrol destroys only such obstacles as will not disclose direction of main effort.	

<i>STANO means</i>	<i>Friendly</i>	<i>Specific example</i>
<i>c. Defense.</i>		
(1) Aerial Photography		KS-100 Camera
Airborne Radar		SLAR
Sensors		Air-Delivered Seismic Intrusion Detector (ADSID).
 (2) Night Vision Devices		
Grd Surv Radars		Image Intensifiers
Direct Illumination		TPS-25, 58
		Searchlight, Visible Light.
 <i>d. Delaying Action.</i>		
Aerial Photos		KS-100 Camera
Airborne Radar		SLAR
Sensors		ADSID

<i>Activity</i>	<i>Enemy</i>	<i>Explanation</i>
Preparation of battalion and company defense areas.	Defense is based on stubborn defense of battalion defensive areas, and counterattacks by tank heavy forces.	
Extensive preparation of field fortifications.	Enemy makes extensive use of trenches, prepared positions, and overhead cover in defensive operations.	
Erecting bands of wire, planting minefields and strengthening of obstacles.	Such activities increase the defensive strength of a position.	
Attachment of additional antitank units to front-line defensive positions.	In areas where there is a serious armored threat, the enemy will concentrate as many as 25 antitank guns for every 1000 meters of front.	
Preparation of alternate artillery positions.	In normal defensive operations, three positions are prepared for each firing battery.	
Large tank units located in assembly areas to the rear.	Tank units are held in assembly areas for employment in counterattack roles.	
Preparation and occupation of successive defense lines.	In the defense, separate and distinct defense lines are prepared and occupied.	
Dumping ammunition and engineer supplies and equipment and fortifying buildings.	Engineer tools and equipment may be used to dig trenches and to erect obstacles.	
Preparation of battalion and company defense positions.	Defense is based on stubborn defense of battalion defensive areas, and counterattacks by tank heavy forces.	
Extensive preparation of field fortifications.	Enemy makes extensive use of trenches, prepared positions, and overhead cover in defensive operations.	
Erecting bands of wires, planting minefields and strengthening of obstacles.	Such activities increase the defensive strength of a position.	
Withdrawal from defensive position before becoming heavily engaged.	In delaying actions units avoid becoming decisively engaged.	

e. Withdrawal Action.

Aerial Photos	KS-100 Camera
Airborne Radar	SLAR
Sensors	ADSID

Rearward movement of long-range artillery and supply echelons.

In withdrawal, the first units to be withdrawn are long-range artillery and the supply echelons which move back under cover of darkness 1 or 2 days before main withdrawal.

Systematic destruction of bridges, communication facilities and other military assets in enemy held territory.

Deliberate demolition and scorched earth tactics may be employed in general withdrawals.

f. Reinforcement.

Aerial Photos	KS-100 Camera
Airborne Radar	SLAR
Sensors	ADSID

Movement of additional troops toward the front.

This action could increase enemy's present strength.

Increased traffic toward present position.

This increased traffic may bring up additional troops and supplies.

Additional command posts and supply evacuation installations.

Presence of additional units would cause an increase in number of these installations.

g. Nuclear Weapons. The presence or use of nuclear weapons may be indicated by:

(1) Aerial Photo	KS-100 Camera
------------------	---------------

Movement of small, heavily guarded convoys, including closed vans, with a high percentage of automatic weapons.

Nuclear warheads are moved under heavy security, usually in closed vans. Escort vehicles are equipped with machineguns.

Movement of pole trailers with rockets or missile bodies.

Pole trailers are used to resupply missile and rocket units.

Preparation of very heavy artillery positions.

Primary and alternate positions for nuclear delivery artillery are prepared prior to movement of the units.

Location of very heavy artillery within supporting distances of front lines.

Nuclear delivery artillery is located within one-third of its maximum range from the line of contact on the offense, and one-half on the defense.

Movement or detection of SP launchers.

Free rockets, and surface-to-surface missiles.

Location of missile and/or free rocket units within striking range.

Missile and free rocket units are located within one-third of their maximum range from the line of contact on the offense, and one-half on the defense.

Identification of tall slender objects, such as towers, chimneys, or narrow trees, not previously in area.

Ballistic missiles may be camouflaged as towers, chimneys, or narrow trees, such as poplars.

2-6

<i>STANO means</i>	<i>Enemy</i>	<i>Specific example</i>
<i>g. Nuclear Weapons—Continued</i>		

(2) Night Vision Devices.	Starlight Scopes
Gnd Surv Radars	PPS-5
Direct Illumination	Searchlight, visible light.

<i>Activity</i>	<i>Friendly</i>	<i>Explanation</i>
Large concentrations of radios, radars, and other electronic equipment located in the vicinity of suitable sites for guided missile launching.		Concentration of equipment is necessary to guide and control guided missiles, and must be located in close proximity of the launching site.
Large, well-guarded complexes including tank trucks, radars, electronic equipment, generators, and maintenance tents, located well to the rear.		Surface-to-surface missile units require extensive ground handling equipment.
Sudden and energetic digging in enemy areas.		Prior to use of nuclear weapons, frontline units may be ordered to dig deeper foxholes or take other individual protective measures.
Special or unusual activity by front line troops.		Frontline troops may construct special positions, usually deep or covered foxholes, prior to enemy use of nuclear weapons.

2-3. Limited War and Stability Operations

a. General.

(1) Limited war and cold war are those stability operations which may or may not involve United States combat forces, which seek to establish, regain, or maintain control of land area threatened by guerrilla action, revolution, subversion, or other tactics aimed at internal seizure of power.

(2) Night operations are of particular importance during stability operations. Insurgent forces characteristically conduct a large portion of their movements and operations at night. They attempt to use darkness to conceal their activities and to limit the effectiveness of their opponent's superior weapons and equipment. STANO systems assist in countering night operations by increasing the friendly forces capability for night surveillance and night movement.

b. Insurgent Operations. Normally an insurgent force lacks such heavy weapons as tanks or field artillery. Their tactics emphasize speed, security, surprise, and deception. Consequently STANO systems are less effective against insurgents than against conventional forces. Nevertheless, when

properly coordinated with other intelligence indications, they can assist in the development of reasonable estimates of the insurgents course of action.

(1) *Aerial photography (visual and infrared).* Such photography can detect large scale insurgent movement and resupply operations. The geographical location of such information may indicate areas of insurgent activity. An increase or decrease in the tempo of such operations may indicate change in insurgent plans.

(2) *Unattended ground sensors.* Sensors can be used as intelligence, target acquisition and alerting/warning means. Properly implanted along trails, they can indicate the passage of enemy personnel and may give some indication of their number and direction of movement. Such data can be used for either decision-oriented or target-oriented intelligence.

(3) *Ground surveillance radars, night vision devices, and thermal imagers.* These devices can be used to continuously track and fix enemy locations.

(4) *Condensation nuclei sensing devices.* These devices can indicate the presence of insurgent concentrations.



CHAPTER 3

SURVEILLANCE, RECONNAISSANCE, TARGET ACQUISITION, AND TARGET DEVELOPMENT

Section I. INTRODUCTION

3-1. General

a. Combat intelligence is that knowledge of the enemy, weather and geographical features required by a commander in the planning and conduct of tactical operations. STANO operations may provide some knowledge of weather and geographical features; however, they are primarily oriented in providing the commander knowledge of the enemy. Finding the enemy in general and locating hostile weapons in particular are key STANO activities within the combat intelligence function.

b. Surveillance is the all-weather, day and night, systematic observation of the battle area for intelligence purposes. Reconnaissance is a mission undertaken to obtain more specific information about the activities or resources of an enemy or potential enemy. Surveillance and reconnaissance are related activities. The distinction between them lies in scope and direction. Surveillance is a continuous watch and does not focus on a specific objective. Reconnaissance is finite in scope and time and has a specific objective. Target acquisition is the detection, identification, and location of a target with sufficient accuracy and in such detail as to permit the effective employment of weapons. Surveillance (including reconnaissance) and target acquisition are closely associated. The means to accomplish either activity are often identical. Night observation as a function of STANO is discussed in chapter 4.

c. STANO operations support the battlefield

objective of destruction of the enemy. Achievement of this objective requires location of both the enemy's maneuver/firepower forces and his supporting elements before they can be brought to bear against friendly forces at a time and place of the enemy's choosing. Although location of these targets may be acquired from data collected from a single source or agency, most often these locations are derived from analysis of information collected by multiple sources and agencies. The management, tasking, coordination and integration of the multiple sources and agencies available to the force in order to locate enemy targets are major activities of the target development process.

d. Target development means the active management and employment, at all echelons, of all available information gathering resources to progressively refine intelligence about the enemy, in order to continuously portray the developing enemy situation for use by the commander as the basis for reaction decisions. Target development, sometimes termed indirect target acquisition, is defined in this chapter as a process not only aimed at developing specific targets, but also at portraying the current enemy situation. Target development is that part of the combat intelligence function which focuses on the enemy. It provides the force commander decision-oriented intelligence for the design and execution of maneuver as well as target intelligence for planning both fire and maneuver.

Section II. SURVEILLANCE

3-2. General

Combat surveillance is a principal means by which the intelligence officer implements his collection plan to provide for the detection of general enemy activity as well as to answer the com-

mander's essential elements of information (EEI). A continuous, all-weather, day and night watch over the battle area requires extensive resources which may not be available to the division and normally are too costly. The information ob-

tained from ground and aerial surveillance sources is provided to the battlefield information control centers (BICC) and the battlefield information centers (BIC) operated by personnel from the military intelligence battalion (combat) (MI Bn (Cbt)) under the staff supervision of the G2/S2. (See chapter 6 for the operations of the BICC/BIC and the organization of the MI Bn (Cbt).)

3-3. Ground Surveillance

Ground surveillance involves the systematic and continuous observation of selected areas, routes, or static locations such as crossroads, bridges, aircraft landing areas, or other specific type installations. Ground surveillance is characterized by generally severe line-of-sight limitations, dependence upon terrain for movement and site locations, and a generally inadequate capability of surface transport to displace surveillance means in time to be responsive to immediate requirements in new areas. Units performing ground surveillance missions provide current information by detecting, locating, identifying, and reporting information of military value. Ground surveillance is conducted in each combat operation by all combat units.

a. Surveillance Operations. When planning surveillance operations, the factors of mission, enemy, terrain and weather, and troops available (METT) will govern the organization and disposition of forces. Since surveillance usually consists of systematic and continuous observation of large areas, long routes or several specific locations, units conducting surveillance missions normally commit the bulk of their forces to performing observation while retaining a small reserve to assist elements that may be attacked by enemy forces. Ground units performing a surveillance mission will usually operate in rear areas, areas adjacent to the forward edge of the battle area (FEBA), forward of the FEBA or provide dismounted elements which can be airlifted into areas forward of the FEBA. Surveillance missions are conducted in a manner similar to that of a screening force or a rear area security operation. Observation posts, listening posts, and patrols are established to provide continuous and systematic observation. A surveillance force is not usually capable of offering strong resistance to the enemy; however, it must be capable of protecting itself. Air cavalry units may extend the surveillance capabilities of ground units beyond the FEBA.

b. Surveillance Tasks. Any unit or organization may be assigned a surveillance mission. Surveillance is routinely performed by units as a part of normal combat operations. Surveillance tasks which may be performed while conducting other primary missions are:

(1) Determination by observation of militarily significant activity (by the enemy or civilians influenced by the enemy) or the absence of such activity.

(2) Location of targets for employment of airstrikes, artillery, chemical, or nuclear fires within assigned areas.

(3) Observation of organic and supporting indirect and aerially delivered supporting fires.

(4) Damage assessment.

(5) Location and identification of enemy units moving or stationary within assigned areas of operations.

(6) Observation of likely avenues of enemy approach and lines of communication.

(7) Observation of routes and key terrain within friendly rear areas.

3-4. Aerial Surveillance

Aerial surveillance complements ground surveillance. Aerial surveillance is characterized by a capability to extend line-of-sight; to become independent of terrain for communications, movement routes and site locations; and to adjust or react rapidly to new requirements. The mobility of aerial surveillance platforms and their ability to operate free of terrain interference provide a capability to conduct surveillance over large areas. The air cavalry and other aviation units of the division, corps, and field army are used to execute reconnaissance and surveillance missions. When aerial surveillance units are used for missions forward of the FEBA, commanders must give careful consideration to enemy air defense capabilities. Generally, visibility restrictions from inclement weather or darkness will reduce the effectiveness of aerial surveillance. Problems of coordination and control of the use of the airspace may impose further limitations on the use of aerial surveillance.

a. Aerial Surveillance Missions. An aerial surveillance mission is characterized by the large expanse of terrain that it covers and the frequency with which it is flown. Aerial surveillance is as continuous over the entire battlefield or area of interest as resources will allow. Generally, it is conducted without regard to specific targets,

though major areas of interest may be emphasized. A surveillance mission normally is performed with a large area coverage sensor such as radar, or by visual or photographic coverage from higher altitudes so that a large ground area can be observed at all times. Radar and some photographic and visual surveillance flights can be flown along or behind the FEBA parallel to the line of contact. Surveillance over-flights of enemy occupied areas may also be employed using visual observation, photography, or radar coverage to both sides of the aircraft's line of flight. The major advantages of aerial surveillance missions are their ability to:

- (1) Cover large expanses of terrain rapidly and continuously, with minimum expenditure of aircraft and sensor capabilities.

- (2) Maintain continuous surveillance over the entire area while flying over friendly positions, which increases the chances of an aircraft completing the mission and returning safely.

- (3) Observe movement or changes as they take place on the enemy side of the FEBA, which will provide the commander with an early warning of probable enemy intentions and identify specific areas for further targeting of collection assets.

b. Collection Agencies.

- (1) The surveillance airplane company and the military intelligence (MI) company (aerial surveillance) are specialized organizations containing Army aircraft and various types of sensors. These companies provide the Army with a limited organic means of getting intelligence information which can be obtained only by aerial means in response to the commander's immediate needs.

- (2) The military intelligence battalion, aerial reconnaissance support (MIBARS), field army, is a specialized organization created to provide the Army an organic means of interpreting, processing, and disseminating intelligence information from aerial reconnaissance missions flown by the Air Force or other services in support of the Army's requirements. It also provides liaison personnel to the reconnaissance elements of the supporting services.

- (3) Contained within the military intelligence organization (BICC) supporting the division are imagery interpretation (II) sections that are immediately responsive to the commander's needs and can provide for all II functions.

- (4) The Army Security Agency (ASA), in addition to other supporting units, provides the

tactical units necessary to conduct the electronic warfare (EW) and signal intelligence (SIGINT) portion of aerial reconnaissance and surveillance operations in support of Army field commands. The electronic warfare element (EWE) of the TOC coordinates electronic warfare support measures (ESM), electronic countermeasures (ECM), and electronic counter-countermeasures (ECCM) operations which are under the staff supervision of the G3 and are immediately responsive to the commander's needs. A detailed discussion of the U.S. Army Security Agency EW functions is contained in FM 32-20. A detailed discussion of other ASA functions, tactical organization, employment, control and command relationships is contained in FM 32-10.

- (5) Army aviation units of the division are all capable of performing visual aerial surveillance missions. In addition, helicopters of the division are also capable of performing airborne personnel detector and other sensory missions when provided the necessary equipment and personnel.

- (6) Tactical air reconnaissance, provided by the Air Force or other Services, is one of the sources of intelligence information available to the commander for planning purposes and for support of operational requirements. This support will vary and normally is tailored to meet the specific tactical situation.

c. Aerial Surveillance Operations. Aerial surveillance operations (fig 3-1) are based on specific requirements for information and the action necessary to fulfill the requirement at any echelon of command. The G2 air may initiate a requirement, or he may receive it from the BICC air section, another staff section, or from a subordinate unit. The division G2 air attempts to accomplish requests from subordinate elements using the division's organic capabilities. When this is not possible, he incorporates approved requests into the division surveillance plan which is forwarded to corps for approval and accomplishment within the resources of higher headquarters. All remaining requests are then forwarded to corps for approval and accomplishment within the resources of higher headquarters. Division missions flown by organic corps aircraft are coordinated beforehand so that ground sensor terminal (GST) and division imagery interpretation support may be alerted to receive the results of missions as they are flown, and the results are processed and interpreted. Processing of ground sensor terminal (GST) IR film can be accomplished by the MI Bn (Cbt). Aerial surveillance operations are covered in greater detail in FM 30-20.

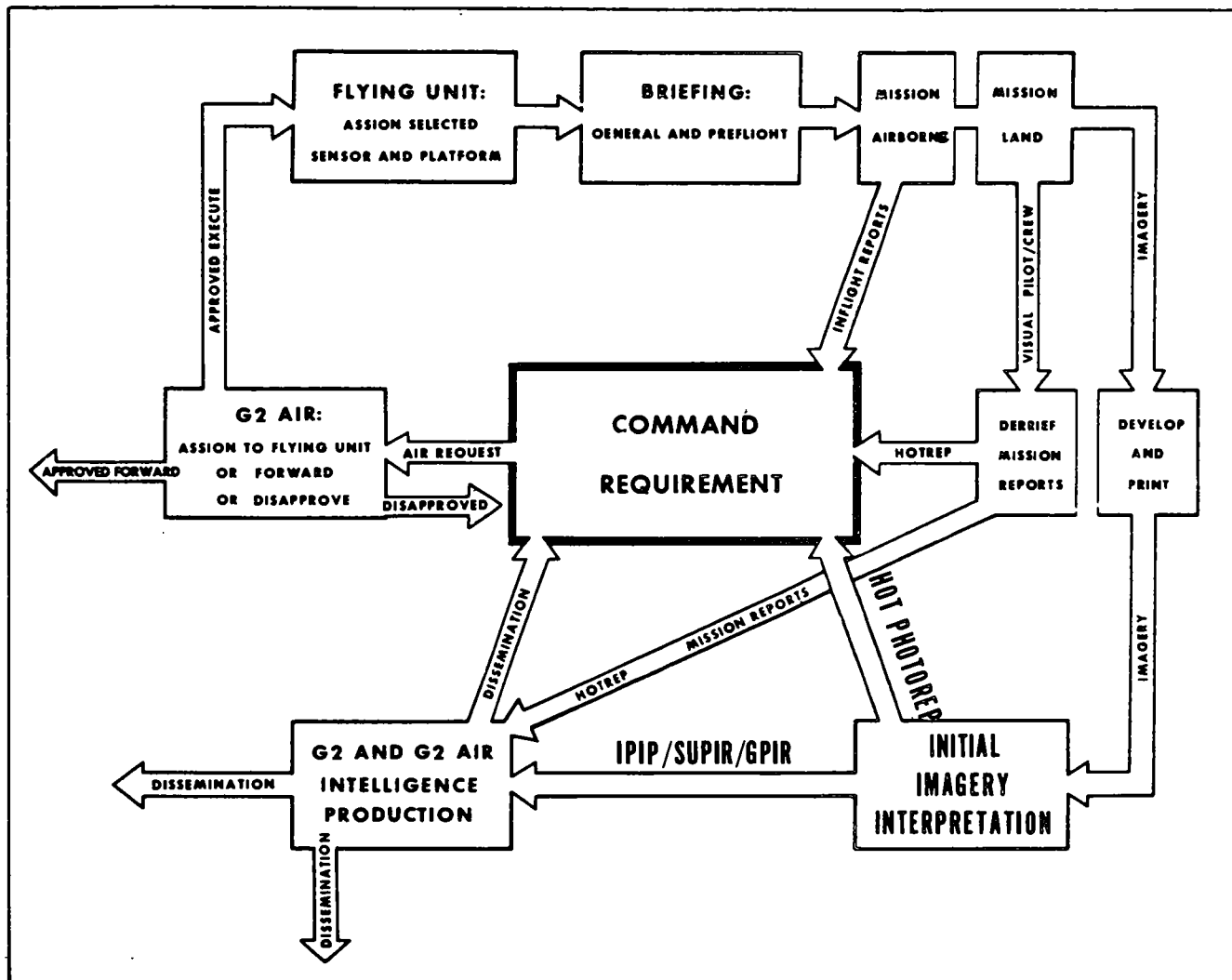


Figure 3-1. Aerial surveillance operations.

Section III. RECONNAISSANCE

3-5. General

a. Reconnaissance is a mission undertaken to obtain information, by visual observation or other detection methods, about the activities and resources of an enemy or potential enemy; or to secure data concerning the meteorological, hydrographic, or geographic characteristics of a particular area. Reconnaissance missions provide specific coverage of areas of general activity detected by surveillance activities. They can also provide periodic coverage for areas where there is a high probability of enemy activity and there are insufficient resources available to maintain continuous surveillance. Reconnaissance missions obtain information which provides for the general development of probable targets in terms of identification, location, and activity.

b. The division must fully exploit its organic reconnaissance capabilities. The officer in charge (OIC) of the division BICC, under staff supervision of the G2, insures that these activities are coordinated and integrated into the division's reconnaissance program. The OIC of the Division BICC prepares the division collection plan and supervises for the G2, the intelligence collection effort of the division. He uses all available means. Reconnaissance may be subdivided into ground reconnaissance and aerial reconnaissance.

3-6. Ground Reconnaissance

a. Ground reconnaissance units consist of personnel manning ground observation posts or surveillance devices, elements of all combat arms,

and units especially organized or designated to perform ground reconnaissance.

b. The division armored cavalry troops are the principal ground reconnaissance unit of all divisions. In addition, each maneuver battalion has an organic ground reconnaissance capability. The range of these ground reconnaissance elements can be extended by providing them with air transportation. Aggressive ground reconnaissance is a positive means of determining disposition and identification of enemy forces. The greater the dispersion of the battlefield, the greater is the requirement for reconnaissance and the more readily ground reconnaissance patrols can penetrate enemy positions and obtain information. Mobility and the availability of sophisticated aerial sensors do not eliminate the need for aggressive ground reconnaissance.

3-7. Aerial Reconnaissance

Aerial reconnaissance must be coordinated with ground reconnaissance. Aerial reconnaissance has a greater capability for range and timeliness, but its information is normally more general in nature.

a. Army Aviation.

(1) Army aviation supports and reinforces ground reconnaissance. Army aircraft have the range, speed, and special sensory equipment to cover large areas rapidly. This capability permits ground reconnaissance elements to concentrate on areas of greatest intelligence potential. Army aviation can extend the range of ground reconnaissance elements by providing them with air transportation to their starting point and picking them up at prearranged locations.

(2) Organic rotary-wing aircraft give the division a visual observation capability; however, none of these aircraft, except those of the armored cavalry, have the primary mission of visual air reconnaissance. These aircraft, when provided with sensory devices such as airborne personnel detectors, image intensification, illumination and infrared systems significantly improve the information collection capability of the division. The BICC at brigade and division, through the G2, coordinate with the G3 and develop procedures to take advantage of the information-gathering capability of Army aircraft without interfering with their primary missions of command, control, and combat support.

(3) Attached or supporting aerial surveillance units from corps or field army provide day

and night aerial photography, near all-weather aerial radar and infrared imagery, and daylight visual reconnaissance. This support includes transmission of infrared and radar images to the supporting ground sensor terminals. Processing is very rapid, and interpretation can be accomplished almost immediately. Aerial photographic imagery requires normal film processing before interpretation.

(4) The armored cavalry squadron possesses the capability to provide reconnaissance and surveillance of the division's area of interest.

(5) FM 1-15, FM 17-36, and FM 30-20 contain detailed procedures for the employment of Army aviation air reconnaissance and surveillance aircraft.

b. *Other Services.* By providing the aerial collection means required to increase the area coverage capabilities of the Army and extend that coverage beyond the limits of organic Army aerial collection means, the capabilities of air reconnaissance elements of the Air Force, Navy, and Marine Corps complement those of Army aircraft as a part of a joint operation. These air reconnaissance elements perform reconnaissance missions over the forward combat area and penetrate the airspace over and behind enemy forward combat elements. Present collection means include visual observation, photography, radar and infrared imagery, radar mapping, electronic reconnaissance, and weather reconnaissance. The greater speed and the capacity of the sensors of the aircraft of these services enable them to cover large areas more rapidly than Army aircraft; however, their speed requires them to operate at higher altitudes and reduces the information gained by visual observation. The attached Air Force tactical air control party and the Fleet Marine Force air/naval gunfire liaison company (ANGLICO) provide advice and detailed information concerning the employment of Air Force, Navy, Marine reconnaissance resources as appropriate.

3-8. Aerial Reconnaissance Requests

a. The air section in the BICC receives, processes, and coordinates requests for air reconnaissance support, thereby providing the management element to support the broad responsibilities of the G2 air. Requests for air reconnaissance support are satisfied by the lowest echelon possessing the means to meet the needs of the requester. When processing the requests, the BICC air section coordinates with the airspace control element to resolve any conflicts involving simultaneous use

of airspace by aerial fire support means, air reconnaissance aircraft, or other aerial vehicles and to arrange for protection of the air reconnaissance vehicle. The BICC air section, in coordination with the airspace control element and attached tactical air control parties, determines which sensor will produce the desired information.

b. The commander requesting air reconnaissance support states the location of the target area, route, or object and the results desired. The BICC air section selects the sensor or sensors that will produce the results desired by the requester. This allows the BICC air section to take advantage of sensors and skills available, to include providing more satisfactory reconnaissance to the combat commander. When the commander asks for a specific type of sensor, the BICC air section is restricted in the resources that it can call upon, and receipt of information is often delayed.

c. Requests that are beyond the capability of

supporting Army aviation are forwarded to the corps G2 air to be fulfilled by corps or field army air reconnaissance elements or by reconnaissance aircraft of other Services.

3-9. Reconnaissance at Night

Ground reconnaissance operations are slower and less effective at night. They usually are limited to dismounted patrolling, observation of routes, and use of listening posts. Vehicular reconnaissance is used without being preceded by dismounted patrols against light enemy resistance and on favorable terrain and routes of advance. Except for short cross-country movements, night vehicular reconnaissance normally is confined to the road net. Night aerial reconnaissance supplements ground reconnaissance. Darkness restricts the acquisition of information by visual means, but the employment of airborne sensing systems makes aerial reconnaissance an important information-gathering activity.

Section IV. TARGET ACQUISITION

3-10. General

a. Target acquisition is that part of combat intelligence that pertains to detection, identification, and location of a target in sufficient detail to permit the effective employment of weapons.

b. Target acquisition elements in the division field artillery are specifically organized, trained and equipped to accomplish the target acquisition mission. These elements are located in the division field artillery headquarters and headquarters battery and in each direct support field artillery battalion. Other artillery target acquisition elements, possessing equipment and capabilities not found in divisions, are available from corps and army resources.

c. Target acquisition normally is associated with field artillery and consists of indirect and direct target acquisition. Indirect target acquisition can best be defined by use of the term target development, which has a much broader connotation because of the impact which STANO and SIGINT resources have made upon the division. A primary function of the artillery target acquisition means is the gathering and reporting of information of importance to artillery operations in support of the combat force. Artillery target acquisition elements are part of the intelligence-gathering agencies of the force and, as such, are a

major component of the combat intelligence system at all echelons. The force G2 makes full use of the target intelligence developed by artillery units in formulating his collection plan. Continual emphasis is placed upon ensuring the flow of acquired information between the artillery target acquisition means and the intelligence subsystem (of the IBCS).

d. The division artillery BIC and the division BICC provide a means for the exchange of this information and intelligence. Similarly, the BIC at the direct support artillery battalions and the BICC at brigade maintain the flow of needed information/intelligence. The field artillery's extensive communications system, target acquisition means and ability to coordinate numerous observers when coupled with the dedicated communications of the BICC/BIC system facilitate this exchange of information and coordination of effort.

3-11. Target Intelligence

a. *Requirements For Detail and Accuracy.*

(1) Target intelligence must be sufficiently detailed and accurate to permit an evaluation of the target's importance in relation to the mission of the command and to permit analysis to determine the most effective weapon or warhead for use against the target. Information collection and

target acquisition agencies must be impressed with the requirement to provide the most complete and accurate target information in order to satisfy the needs of specific users.

(2) Requirements for detail and accuracy will vary with the weapon or response to be employed (e.g., air strike, artillery, maneuver force), the type munition (e.g., HE, chemical or nuclear), the type fire (e.g., indirect or direct, observed or unobserved) and the effect desired (e.g., neutralization, destruction, harassment).

(3) Target information must be reported as completely and accurately as time requirements, and the existing situation permits. This is not to imply that incomplete information should not be reported. The nature of target development activities is such that even minimum new information may serve to validate or complete information already available.

b. Requirements for Timeliness.

(1) Timeliness in acquiring targets is essential, since the enemy will try to avoid presenting lucrative targets, and those presented will be made as transitory as possible.

(2) Requirements for timeliness vary. Some information, such as that gathered by unattended ground sensors, is immediately available for interpretation. Other information, such as photographic imagery, requires processing before it can be used. Requirements for timeliness vary with the nature of the target (i.e., whether it is permanent, semipermanent or mobile; whether it is building up or dispersing; and whether it is an immediate or future threat to the accomplishment of the mission). Forces in contact have the most stringent timeliness requirement.

(3) To insure timeliness in target acquisition, all commands and target acquisition agencies must be authorized to report information directly to whatever agency has the capability to react rapidly. Every effort should be made to prevent any unnecessary delay in reporting target information/intelligence. Delays caused by excessive intelligence processing or the use of circuitous reporting channels should be avoided (chap 6).

3-12. Direct Target Acquisition

a. Traditionally, direct target acquisition has

been thought to be accomplished only by the application of means designed for that purpose (e.g., forward observers, observation posts, aerial observers, counter mortar/battery and ground surveillance radars, flash and sound ranging devices, and radio direction-finding equipment). These means are an integral part of the artillery fire support system and are designed to be employed specifically to acquire targets for the artillery and other fire support means. Implicit in the application of these elements is the requirement for detail, accuracy and timeliness sufficient for rapid target analysis and response (see FM 6-121).

b. Direct target acquisition can be, and is, accomplished by other means (i.e., by units in contact, ground surveillance radars, night vision devices, searchlights, patrols of all types, survey parties, imagery acquired by aerial means, signal intelligence, electronic warfare support measures, ground and air reconnaissance elements, unattended ground sensors, airborne personnel detectors, and virtually anyone who sees a target and has the capability to communicate the required information to a reaction means). At times many of these means will be given the specific mission to acquire targets (e.g., long range patrols, aerial imagery, or surveillance radars which have been surveyed into the common grid). Although all the various means may not be formally included into a recognizable target acquisition system similar to the field artillery systems, they play an extremely important part in target acquisition in support of current operations.

c. Direct target acquisition is also accomplished by sensor-equipped armed/attack helicopters. Available airborne sensor systems include airborne searchlights, forward-looking infrared, moving target indicator radars, and low light level television. These systems allow aerial acquisition of targets during periods of darkness or reduced visibility. Coupled with the helicopter armament system, they afford an accurate, real time acquisition and engagement capability.

d. Target damage assessment resulting from direct target acquisition activities is furnished to the intelligence subsystem in order to update the intelligence data base, influence collection and operational planning activities and appropriately modify the target development process.

Section V. TARGET DEVELOPMENT

3-13. General

a. Target development means the active management and employment, at all echelons, of all available information-gathering resources, to progressively refine intelligence about the enemy, in order to continuously portray the developing enemy situation for use by the commander as the basis for reaction decisions. Active management of resources at each echelon of command provides for the continuous update of the intelligence information base. This management and tasking effort also contributes to the target development process by providing for the progressive refinement of detail. It culminates in the determination of current enemy activity and the precise location of the enemy in time and space. This intelligence is passed to other subsystems of the IBCS. Such intelligence, available to the Commander's Integrating Subsystem, provides the basis for decisions to engage the target through fire or a combination of fire and maneuver.

b. Target development operations extend throughout the area of interest of the commander. This area includes a unit's sector in defense or a zone of action in the offense, areas adjacent thereto, and extending into enemy territory to the objectives of current or planned operations. It includes any area occupied by enemy forces who could jeopardize the accomplishment of the commander's mission. Since areas of interest extend beyond operational boundaries, there are large areas of overlap in unit areas of interest. It falls to the next higher headquarters to coordinate and consolidate the requirement of its subordinate units to most effectively use the available collection agencies.

c. The commander seldom, if ever, possesses the means for obtaining all the information he needs on the enemy. Each commander does, however, possess means for obtaining some of this information. He turns to higher headquarters and other Services who normally assist in the collection effort and have the capability of obtaining information from deep within enemy territory. This produces a requirement for the rapid exchange of information.

d. Target development is also influenced by many variables such as the type and intensity of warfare, enemy tactics and patterns of activity, terrain features and vegetation, weather conditions, day or night operations, deception, camou-

flage, vulnerabilities, and countermeasures that can influence detection/development capabilities.

e. The G2 has general (coordinating) staff responsibility for target development. The BICC/BIC, under staff supervision of the intelligence officer, provide a means for coordinating the target development resources available to the division. Staff determination of the response or reaction means rests with the operations officer. Responsibility for the execution of fire support means rests with the fire support coordinator. It is imperative that the intelligence officer, operations officer, and fire support coordinator jointly consider "on-hand" as well as new information and intelligence on the enemy to facilitate assignment of collection assets to target development. Such joint consideration will insure the continued refinement of information oriented to user's needs and the proper coordination of target development activities.

3-14. Target Development Planning

a. Target development planning is under the staff supervision of the intelligence officer at all echelons. The G2, in coordination with the G3, assigns mission priorities in a manner similar to that for processing reconnaissance requests.

b. The G2 has the primary general staff responsibility for—

- (1) Planning the systematic watch of the battle area.
- (2) Assigning mission priorities in coordination with the G3.
- (3) Coordinating and integrating all surveillance activities.
- (4) Developing intelligence from the information acquired.
- (5) Furnishing to users the resultant intelligence data.
- (6) Procuring information required for damage assessment.

c. The G3 has the primary general staff responsibility for—

- (1) Designating units for conduct of surveillance in accordance with the mission priorities established by the G2.
- (2) Furnishing information on friendly forces, to include their location, activities and plans.
- (3) Specifying target characteristics that are compatible with the mission.

d. All surveillance resources are integrated to provide for their effective application and coordinated use in covering the commander's area of interest. This is particularly necessary in view of the ever-increasing enemy capability to deny use of the airspace and to impair or deny use of electronic detection and communications devices.

e. In assigning orders and requests for specific information, the capabilities and current and projected tactical mission requirements of the respective units are considered.

f. Detailed control, coordination, and supervision are necessary to guard against gaps or similar deficiencies in the combat surveillance coverage of the area of interest. Provisions are made for inspections, reports, and maintenance of patrol, reconnaissance and surveillance plans, and surveillance capability overlays.

3-15. Target Development Operations

a. The formulation of specific orders and requests is particularly important to successful target development. The collection plan provides the intelligence officer with a basis for subsequent tasking. This tasking may be formally published as the STANO plan or it may be accomplished by means of fragmentary orders or requests.

b. Early in the planning stage of an operation, a list of potential targets is developed. Such factors as mission, characteristics of the area of operations, and enemy tactics and patterns of activity are studied to select those areas in which targets are most probably located.

c. The collection effort provides for systematic surveillance to detect targets. Areas of particular importance to operational plans are subject to more intensive surveillance than other areas. Target development folders should be developed and maintained by the inclusion of target intelligence and other material related to planning and executing action against a specific target.

d. The target development effort is then directed toward securing information to verify, identify, accurately locate, or disprove the presence of suspected targets. This is accomplished by assigning suitable collection tasks to collection agencies.

e. Through target development, information of enemy activity is generated as an integrated process. All sources of information are exploited. This includes surveillance and reconnaissance assets, human resources collection activities, signal intel-

ligence and field artillery target acquisition means. No one bit of information in itself provides all that is required to be known about the enemy. All of the available sources of information, however, when channeled through the focal point of the BICC/BIC system and given thorough analysis can provide the capability for accurately assessing the enemy situation.

3-16. Target Development Process

a. The target development process should be considered as a part of the sequence of action for target engagement. This sequence includes some or all of the following steps:

- (1) Detection of general activity.
- (2) Collection of collateral information.
- (3) Targeting of collection assets.
- (4) General development of probable targets.
- (5) General identification of a target.
- (6) Target acquisition.
- (7) Selection of weapons, maneuver elements, type of munition, type of fire, effect desired.
- (8) Designation of the target.
- (9) Hand-off to a reaction element.
- (10) Target engagement.
- (11) Target damage assessment.

Within this sequence, the target development process includes steps (1) through (6) and (11) above, and begins with the planning effort. This planning includes preparation of the STANO Plan (chap 9) and influences of other intelligence and operational planning efforts.

b. The detection, location and identification of suspect, probable, or confirmed targets is a result of the process of analyzing and correlating information from all information collection means. Targets so located may provide the basis for further directing the collection effort, planning operations, committing maneuver forces, executing harassing and interdicting fires, or attacking (immediately or preplanned) by fire support means. The development process is one of continuous refinement of detail (i.e., it may progress from a suspect area located only generally, through successive stages until a confirmed target is located accurately and identified exactly).

c. A systematic target development process can be illustrated by using a grid control system imposed over a unit's area of interest.

(1) Figure 3-2 portrays schematically a division area of interest over which an arbitrary grid

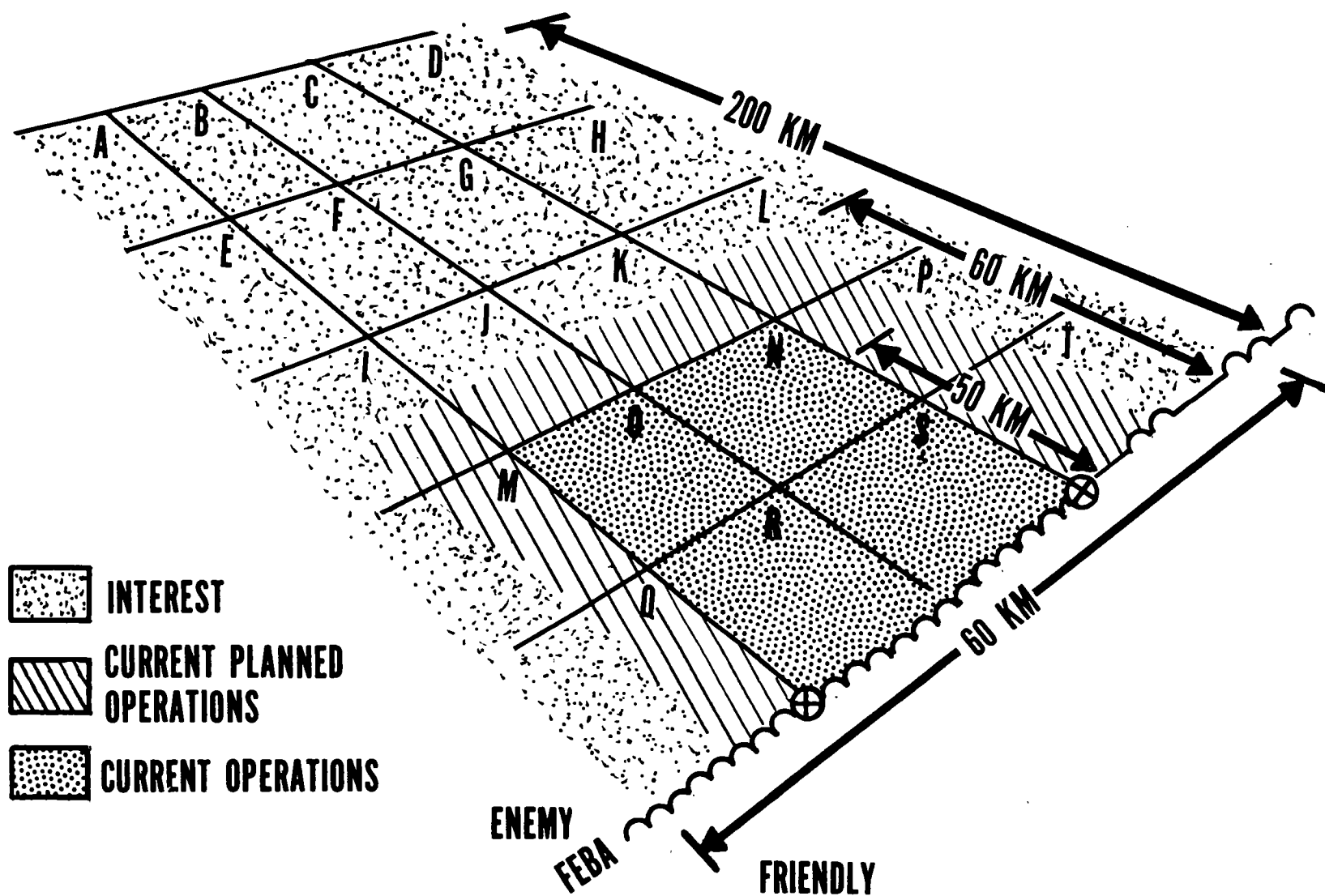


Figure 3-2. Grid control system.

control system has been imposed. The area of interest is divided into areas of current and planned operations. The grid control system further divides the entire area into lettered grids. The distances selected are only for the purpose of illustration; other distances for different sized units could also be used.

(2) In the grid areas out to 200 KM, the target development process is aimed at the detection of general activity. It starts with the current intelligence analysis and the collection of collateral information from primarily human resources collection activities (agents, document exploitation, other national sources). SIGINT resources as well as information from other Services also contribute to the determination of activity, and serve to further define those grid areas that must later be covered in detail. Targeting of collection assets in the grid area beyond 60 KM requires primary reliance on long range collection means provided by higher headquarters.

(3) Information developed during the collection of collateral information and results obtained from the subsequent tasking of information collection agencies provides for the general development of probable targets. The general identification and location of targets from this effort will serve to establish the presence or absence of activity within the various grid areas. Maximum reliance is placed in attacking these targets with area coverage weapons systems, weapons and ammunition that provide for highly lethal wide area destruction. Response or reaction is not always immediate. There may be times that the response to a probable target is delayed in order that a more detailed analysis of enemy activity can be made.

(4) This development effort traces enemy movement through the various grid areas. As the enemy approaches the effective range of friendly artillery/missile systems, the areas within detection range afford an increasing variety of information gathering systems. Ground radars, sensor equipped armed/attack helicopters, unattended ground sensors, and ranger patrols are all tasked in an integrated and coordinated effort to develop the enemy situation. The target development process provides for a screening and correlation of the information available in order to identify those targets posing the greatest threat.

(5) In addition to providing a portrayal of the enemy situation, targets in close in grid area may be identified and located with sufficient accuracy to enable the selection of an appropriate response/reaction. Such targets will be designated for attack and passed to the reaction element for engagement. Targets are also identified and attacked by direct means such as the field artillery systems.

3-17. Target Development Coordination

a. The intelligence officer and the operations officer should closely coordinate the target development effort, particularly to insure proper tasking and utilization of ground and aerial reconnaissance assets of the division. In addition, division operational planning efforts should be strongly influenced by the information available at any stage in the target development process.

b. The techniques involved in the processing of target acquisition data are extremely important in establishing the degree of responsiveness with which targets can be engaged. Targets capable of displacing rapidly and/or posing a serious and immediate threat to the security of friendly forces must be engaged as soon as possible after they have been acquired. target acquisition means are limited in the time they can locate targets by the operational characteristics of each device employed. Normally, these time factors do not, in themselves, constitute a responsiveness problem. Degradation of responsiveness is caused by the time consumed in the transmission and processing of target acquisition data between the acquisition source and the unit selected to engage the target. All possible measures, such as incorporation of engagement criteria and reporting formats in local SOP establishment of adequate communications channels (dedicated, if necessary), and prior coordination between supporting and supported units, must be instituted to reduce to a minimum the time required to transmit and process target acquisition data. This degradation is negligible when sensor-equipped armed attack helicopters are utilized for target acquisition and engagement.



CHAPTER 4

STANO EQUIPMENT AND ITS ENVIRONMENTS

Section I. INTRODUCTION

4-1. General

a. Within the division there are many different types of STANO equipment available to meet the commanders' requirements to collect intelligence information as well as facilitate night operations. Each type of equipment has characteristic capabilities and limitations which determine the conditions under which it functions most effectively. No single type of STANO equipment can satisfy all of a commander's information needs, nor can a single type function effectively in all operational and physical environments. It is, therefore, necessary to employ a balanced combination of available means to insure adequate coverage of the battlefield.

b. Commanders and staffs must be familiar with the capabilities and limitations of the STANO means available to the command. Such knowledge is essential for sound planning and efficient employment of all information-collecting assets.

c. In regard to vulnerabilities, staff planners should note that many STANO devices rely on electromagnetic and/or light energy for the sensing function, and transmission of sensed data via communication link to the monitoring station. As this energy is radiated, the STANO system becomes exposed to the hazard of hostile signal detection, interception, analysis, direction finding, and the potential consequences of electronic countermeasures (jamming and deception). The detailed discussion of jamming and deception contained in FM 31-40 and FM 32-20 is applicable to STANO systems.

4-2. Night Vision Devices

Night vision devices generally are categorized as active and passive:

a. Active Devices. Active devices illuminate the target by employing white or infrared light. This supplemental light assistance normally is required

when the natural light level is insufficient to meet the technical capabilities of the viewing device. It must be noted, however, that any active source of light is susceptible to detection and in some instances to exploitation by deception countermeasures.

b. Passive Devices. These devices do not depend upon artificial (man-generated) light assistance, but rely upon the natural radiation reflected from or emitted by the target. Artificial visible or infrared illumination may be employed to increase the effectiveness of passive devices. Examples include image intensification devices which rely upon reflected visible or near infrared light. Therefore, artificial visible or infrared illumination may be used to increase the effectiveness of these devices. Thermal imaging devices, however, rely solely upon the contrast between the emitted thermal radiation of the target and its background, and are therefore, in the purest sense of the term, passive in nature.

c. General Characteristics and Capabilities. Night vision devices employing image intensifiers present target images to the operator in much the same way as standard optical devices (e.g., 7×50 or 6×30 binoculars or battery commander scopes and telescopes). Exposed targets or targets concealed by darkness may be detected and identified within the effective range of the device. Range is dependent upon the size of the image intensification tube and optics used, as well as the amount of available ambient light. Ranges are greatly increased when the device is used with supplemental light assist. Pulse-gated illumination devices provide accurate ranging of targets as well as a limited capability to penetrate fog, haze, smoke, and rain. When employed with pulse-gated equipment or supplemental illuminators, image intensification devices become an active device and may be detected by the enemy.

d. Limitations. Image intensification devices are not designed for daylight employment or exposure

to high intensity light sources. However, these devices will not function effectively when the light level drops below starlight, except when supplemental illumination is provided. Rain seriously degrades the efficiency of the image intensifiers unless a pulse-gated system is used. Pulse-gated equipment is generally heavy and is subject to enemy detection.

e. Application. A large number of passive night vision devices are available at all levels from company through division. Examples include: Image intensifiers (starlight scope, night observation device (NOD), and crew-served weapon sight), and thermal imaging devices (thermal viewer). Such image intensifiers are employed in rifle sights, tank fire control equipment, aerial and ground surveillance devices, and night visual aid equipment for the individual soldier. Examples of active devices are strobe lights, infrared searchlights, laser range finders, and metascope.

4-3. Battlefield Illumination

The purpose of battlefield illumination is to provide sufficient light for friendly forces to conduct operations during periods of darkness. Proper use of illumination permits more effective execution of night offensive and defensive operations; makes possible better coordination and control of attacking elements; facilitates the organization of defensive positions and the conduct of the defense; permits maintenance, repair, recovery, evacuation of equipment, and promotes troop confidence and morale. The employment of illumination is favorable for nuclear-supported night attacks because the consideration of secrecy normally is eliminated by the nuclear attack, and the use of illumination will facilitate a more rapid exploitation. Conversely, the employment of battlefield illumination, other than subdued or non-visible light, can negate the advantage attainable through the use of night vision devices.

a. Direct Illumination. Direct illumination is provided by light from pyrotechnics or searchlights. The intensity of light provided by direct illumination varies according to the source of illumination.

b. Indirect Illumination. Indirect illumination (artificial moonlight) is a type of battlefield illumination obtained by employing searchlights against cloud banks or terrain masses, thus using the reflected, diffused light to illuminate the area of interest.

c. General Characteristics and Capabilities. The

oldest night vision aid is battlefield illumination by fires and flares. The most familiar device for battlefield illumination is the searchlight. Searchlights may be used for direct or indirect illumination. Indirect illumination over a large area is achieved when the searchlight beam is directed towards a low cloud bank which reflects light upon the battlefield. A level of illumination equivalent to moonlight may be achieved through indirect illumination. More recent techniques in illumination incorporate lasers and laser illuminators.

d. Limitations. Battlefield illumination employs active systems, and the enemy can detect their use. Indirect searchlight illumination produces a low light level and cannot be used for long range observation without supplementary night vision aids. Searchlights are also vulnerable to heat-seeking weapons.

e. Application. Artificial illumination may be used in any situation to supplement ambient light conditions. It is used for maneuver, application of firepower, surveillance, observation, or target acquisition. It may be used as a deception measure. Pink light can be used when light intensification devices, IR sensing devices, and/or IR binoculars are employed. Tank-mounted searchlights are used to assist in all applications, i.e., maneuver, firepower, surveillance, observation, or target acquisition.

4-4. Thermal Imaging

a. General Characteristics and Capabilities. A phosphorescent tube is used to display a thermal image. The thermal image device detects the differences in temperature between materiel or personnel and other objects in the immediate area. Objects with a marked temperature difference, such as hot metal, weapons, and vehicles (to include exhaust gases), appear brightly on the display tube as black or white signatures in contrast to the cooler surroundings. The transmission characteristics of thermal radiation provide a limited penetration capability through light foliage. Thermal imaging devices can be employed in daylight or darkness, and are difficult to detect by the enemy.

b. Limitations. The effective range of thermal imaging devices is reduced during periods of inclement weather.

c. Applications. Thermal imaging sensors are used for surveillance, target acquisition, and fire control in ground-vehicular and aircraft-mounted

systems, such as the Mohawk mounted thermal imagery system.

4-5. Aerial Photography

a. General Characteristics and Capabilities. The utilization of aerial photography provides 24-hour surveillance capability as well as a permanent record of the target scene. Various light sources, flares, flasher systems, infrared, and the laser line scan camera employing a laser beam provide the capability for obtaining vertical photography of excellent resolution.

b. Limitations. Aerial photographic techniques have inherent limitations, the primary problem being the requirement for an aerial platform to transport the camera system. The aircraft is susceptible to enemy observation and countermeasures. Those most responsive to the division in the field have a limited range capability in general warfare, and their angle of observation may negate clear target definition. Oblique and panoramic photography is restricted to daylight hours. Atmospheric and weather conditions also tend to degrade photography, and may prevent photography under severe conditions (FM 30-20). Consideration must be given to the time required between exposure of the film and delivery of prints to the user.

c. Applications. A typical application is the Mohawk photographic system which is designed to overfly terrain of interest (available from corps assets). The use of the flasher system enhances the Mohawk capability for night photography. Less sophisticated applications include the hand-held camera used to photograph targets of interest during the hours of daylight.

4-6. Condensation Nuclei Sensing

a. General Characteristics and Capabilities. Condensation nuclei sensing is a method of detecting condensation nuclei, e.g., submicroscopic airborne combustion particles such as campfire smoke, or exhaust fumes from motor vehicles. These submicroscopic particles in the air are indicators of presence of recent (periods up to about 24 hours) human activities in a given area. Conditions favoring optimum detection are a steady, unidirectional light wind (3 to 5 knots), lapse condition (rising air), and immediately after a rain.

b. Limitations. Strong winds (above 8 knots) and variable directional winds cause combustion

particles to diffuse rapidly thereby severely limiting or precluding their detection. An inversion condition (descending air) impedes the ascent of combustion product particles, thereby severely limiting their detection.

c. Typical Application. An example of a condensation nuclei sensing device is an aircraft-mounted concealed personnel detector which is commonly referred to as an airborne personnel detector. Components of this type detector include two identical condensation nuclei detectors and a strip-chart recorder which indicate the relative concentration of condensation nuclei in the sampled air. This type detector, accompanied by an observer, is mounted in a helicopter. The helicopter is flown near tree-top level over a target or search area, e.g., dense foliage, likely ambush sites, or trail areas, and air is drawn into the detector. The detection of condensation nuclei in the sampled air is an indication of present or recent area occupation or activities by humans.

4-7. Radar

a. General Characteristics and Capabilities. Radar is one of the few sensors that approaches on all weather, day or night capability. The most widely used radar for tactical employment incorporates the moving target indicator (MTI) technique for locating targets. This technique suppresses stationary clutter and intensifies moving targets. Aerial radar used in Army surveillance aircraft has an MTI and a fixed-target (FT) capability. Major terrain features and structures can be detected and identified from the FT display. Special purpose radars are designed to perform functions such as foliage penetration or metal detection. Of all the surveillance techniques now in use, radar provides the greatest range capability for detection of moving targets.

b. Limitations. The moving target indicator (MTI) technique is not effective in detecting fixed targets such as terrain and structures. However, radars used today can produce information on fixed targets which when properly analyzed can produce intelligence input data. MTI radar has an excellent long-range target detection capability; but, it is restricted to line-of-sight detection, and its ability to recognize or identify targets is relatively limited. Although the range of radar may be extended by mounting it on an aerial platform, the availability of the system is then limited by weather considerations. Since radars are active systems, they are subject to electronic counter-

measures which may inhibit or prevent their employment.

c. Application. A wide variety of radar equipment is emerging for use at all levels from company through division. Examples include foliage penetration radar, terrain avoidance radar (aerial), and mortar/artillery locating radars.

d. Vulnerabilities. Each time a radar is activated, its signals are subject to enemy intercept. The intercepted signals provide enemy analysts the location and signal parameters of the radar, thereby aiding in the identification of radar type and its association with specific military units. Appropriate means to jam or deceive the radar are identified by the analysis of the signal.

4-8. Unattended Ground Sensors (UGS)

Unattended ground sensors are a STANO subsystem composed of various types of sensing devices and their receiving/monitoring equipment. There are two basic types of UGS: (1) line sensors, which are employed in base/border and other tactical operations to detect intruders crossing a linear trace, and (2) tactical radio frequency (FR) sensors, which are employed in mobile operations by combat troops.

a. Line Sensors. These sensors employ the following sensing techniques:

(1) *Seismic sensing.*

(a) General characteristics and capabilities. Seismic sensing detects the vibrations of the earth caused by the passage of an object. As a truck or man traverses terrain, vibrations are caused within the earth. These vibrations travel extended distances before dissipating. Because of this characteristic, the seismic technique has evolved as an effective sensing method. The military usefulness of seismic sensing has been improved by the development of internal logic circuits which provide a degree of discrimination in the detection of targets of interest.

(b) Limitations. The detection range of the seismic sensor is limited by the ability of the soil to transmit vibrations. This range limitation requires that either a large number of sensors be emplaced or that detailed plans be made for effective employment. Seismic sensors can be activated by a variety of vibration sources, thereby generating nontargetable alarms. The frequency of such false alarms may be reduced to some extent by appropriate logic circuits and sensitivity adjustments.

(c) Applications. An example of a seismic sensor is the Alarm Set, Restricted Area; Anti-Intrusion AN/GSQ-133 (USD) which detects vibrations and then transmits a signal to a monitoring station. With some sensors, the seismic recognition of a target alone is not sufficient to initiate a signal. A second target signature, such as the presence of metal or heat, may be required before the warning signal is transmitted.

(2) *Pressure sensing.*

(a) General characteristics and capabilities. A pressure sensor is designed to recognize the pressure caused by the passage of an object. It may be point located, as is a pressure sensitive mine, or it may be deployed in a linear arrangement. The latter example is most commonly used. In a typical linear pressure sensing example, a liquid filled hose is buried along a potential intruder route. As the intruder's weight compresses the soil around the hose, the device will transmit a warning.

(b) Limitations. Pressure sensing devices are extremely sensitive to the type terrain and the weather. In cold climates, frozen ground may render the device useless. The emplacement of the linear sensors is slow. Linear sensors do not lend themselves to effective employment in rapid-moving situations.

(c) Applications. Pressure sensing systems such as the balanced pressure system (BPS) are typically employed in fixed locations where the installation time is not critical, and a permanent device is required. Base camps and border installations are good examples.

(3) *Magnetic sensing.*

(a) General characteristics and capabilities. Magnetic sensing detects the movement of ferrous material through a magnetic field. These devices are quite selective, since only ferrous material will cause an activation, thereby eliminating alarms from animals or similar targets.

(b) Limitations. Magnetic sensing will not recognize intruders who do not carry metal on their person. The range of the device is limited since only a small magnetic field can be generated. In order to increase the area in which detection is possible, linear sensing devices have been developed; however, their installation is tedious.

(c) Applications. Magnetic sensing such as the Multi-Purpose Concealed Intrusion Detector (MICD) (OT-514-GSQ) has proven quite effective in detecting the movement of enemy vehicles. It also is used to confirm the presence of enemy activity when coupled to another type of sensor,

such as when used with a seismic and/or acoustic sensor.

b. Tactical Radio Frequency Sensors. These sensors use the following sensing techniques:

(1) *Seismic.* Same technique as used in line sensors.

(2) *Magnetic.* Same technique as used in line sensors.

(3) *Electromagnetic sensing.*

(a) *General characteristics and capabilities.* Electromagnetic sensing is a method of detecting a moving intruder. A radio frequency (RF) field or pattern is activated around an antenna, and as an intruder moves within that field his body will act as an antenna, which in turn will change the properties of the emitting antenna. This change will result in the transmission of a warning signal. Electromagnetic sensing devices normally are quite small and easily concealed, since only the antenna must be exposed.

(b) *Limitations.* The electromagnetic sensor is susceptible to movement within its RF field. This becomes critical when it is positioned near foliage, tall grass, or other objects which will move in the wind. It is best located in clear, open terrain. Adjustments may be made to decrease the sensitivity of the device; however, decreased sensitivity decreases the detection range. Most devices require that the intruder traverse the RF field at the average velocity of a walking man; consequently, they would allow a man moving at a slow crawl to pass undetected. The continuous RF field required for the operation of the device consumes power; therefore, the sensor requires an ample power supply.

(c) *Typical applications.* An example of an electromagnetic sensing device is the Electromagnetic Intrusion Detector (EMID), which consists of an antenna camouflaged to resemble a weed, vine or stalk of grass, and a small logic/transmitter package. It may be successfully used in open terrain, along trails, and on beaches.

(d) *Vulnerability.* Any sensors which must relay information to remote read-out stations by means of radio signals are vulnerable to interception of its signals, and to jamming or deception against its receivers.

(4) *Acoustic sensing.*

(a) *General characteristics and capabilities.* Acoustic sensing is based upon the familiar microphone which detects audio frequencies. This technique may be enhanced by using spectrum analyzers to analyze the sound wave and provide

improved definition of the target source. Acoustic devices are usually omnidirectional in nature but can be designed to provide a directional capability.

(b) *Limitations.* Acoustic devices are extremely sensitive and, consequently, in a noisy combat environment tend to transmit extraneous signals. For this reason, the acoustic devices are best employed in the commandable mode. Thus, the monitor will detect an intruder with some other technique and then identify the target by activating the acoustic device. Acoustic ranging or direction-finding devices require a relatively quiet environment for effective operation.

(c) *Typical applications.* Acoustic devices are typically employed in two roles: (1) Unattended ground sensors, and (2) ranging and azimuth counterbattery systems. Examples include the ACOUBUOY or ACOSID unattended ground sensors, and the counterbattery sound ranging systems employed by artillery. In both applications, audio signals provide target location or direction.

(5) *Disturbance sensing.*

(a) *General characteristics and capabilities.* Disturbance sensing employs the principle of recognizing physical contact with the target. In this instance, contact with the device will activate a warning signal. Excellent examples are the many boobytrap detonators currently available; however, these devices are not used in a sensor role. One of the most common disturbance sensors presently in use is the noiseless button bomblet (NBB) which contains a very small radio transmitter and a triggering network. The device is further disguised as a small twig, branch, chip of wood or, in some cases, as animal excrement. As an intruder traverses an area that has been seeded with these sensors, he may cause one to activate. The radio frequency warning is then relayed to a monitoring station.

(b) *Limitations.* The problem with this device is the requirement that the intruder directly contact the sensor. In order to increase the probability of detection, an area must be densely seeded. Additionally, the disturbance sensor is susceptible to a high level of false alarms caused by animals, heavy rainfall, or similar disturbances.

(c) *Applications.* Disturbance sensors are useful in gathering information concerning enemy movements and areas of activity. They may also be used for locating targets for supporting indirect or aerial fires.

(6) *Active infrared sensing.*

(a) *General characteristics and capabilities.* Active infrared (IR) sensing employs the principle of line-of-sight which detects an interrupted beam of light. Equipment normally consists of an IR source/transmitter, and an annunciator.

(b) *Limitations.* The IR sensor must be carefully emplaced to insure the beam has nothing to interrupt its path. False alarms will result when trees or vegetation blow across the beam path.

(c) *Applications.* Active IR sensors are useful in detecting personnel and vehicular intrusions across a perimeter, along a trail, or into a secure area.

(7) *Radar sensing.* These devices are directional or omnidirectional doppler radars which can be employed continuously. Radar sensing devices do not recognize stationary targets and may be limited by weather conditions. (For applications and limitations, see paragraph 4-7.)

4-9. General Problem Areas Associated With STANO Equipment

As with many items of military equipment, certain inherent problems are present:

a. Power sources for STANO equipment vary from short-lived batteries to generators with various degrees of noise level. Climatic conditions, particularly extreme temperatures, have an adverse effect on battery life and efficiency. Both the replacement of batteries and their storage under optimum conditions must be recognized as major problem areas when employing STANO equipment.

b. Communication and frequency management procedures may restrict the use of some STANO items of equipment.

c. Peculiar maintenance and logistic problems are prevalent, which require special management procedures.

d. Special training of both operators and maintenance personnel is required on numerous STANO devices.

Section II. RELATED STANO MATERIEL

4-10. Vision/Optics

a. *General Characteristics and Capabilities.* Vision/optics refers to the use of standard optical devices that amplify the target or scene. Examples include the standard daylight binoculars (7×50 or 6×30), battery commander scopes, and telescopes. Their function is to magnify and instantly present a visual representation of the target area. Their use extends acquisition range far beyond the normal capability of the human eye. Additionally, a stabilization capability may be coupled to the device, permitting the presentation of a stationary image when the optical instrument is vibrating.

b. *Limitations.* These devices are limited primarily to daytime use. During periods of reduced visibility, their use is restricted to areas having clear atmospheric conditions and light levels comparable to full moonlight or greater.

c. *Application.* Optics instruments perform a

wide number of functions, including surveillance, fire control, and special-purpose applications such as laying artillery weapons with an aiming circle.

4-11. Scout Dogs

The use of trained scout dogs to augment STANO systems can be particularly valuable in reconnaissance operations and perimeter security. Dogs can augment visual aids during periods of reduced visibility or darkness using their senses of sight, smell, and hearing. Dogs may also assist in positioning reconnaissance patrols without being detected by the enemy. Although dogs are capable of operating in all types of terrain and weather, their effectiveness may be greatly reduced by extremes of either and by extended periods of utilization. The location of tunnels and caches, mines, boobytraps, trip wires and other man-made devices are activities in which the employment of dogs can be particularly productive. (See FM 20-20 and FM 21-75.)

Section III. ENVIRONMENTAL CONSIDERATIONS

4-12. Cold Weather Operations

a. In any type of environmental operation, men and equipment must be adapted to the restrictions

and limitations imposed by that environment. Cold weather operations probably offer the widest range of adaptations that must be made.

b. Instalaltion of STANO equipment takes longer in cold weather than in temperate conditions. Personnel need special training to operate and maintain their equipment. Communications may be adversely affected by ionospheric disturbances, and it may be difficult to distinguish between ionospheric disturbances and some types of noise jamming.

c. Equipment that is compatible with the environment is essential. This includes equipment tailored for use only in snow, and conventional equipment that must be adapted to the extreme temperatures and poor ground communication routes. Maintenance and operational procedures for this equipment will differ from those for normal equipment under temperate conditions.

d. FM 31-70 and FM 31-71 contain detailed information on cold weather operations, employment of arms and services, and training.

4-13. Desert Operations

a. Desert regions cover vast territory and demand highly mobile forces and a flexible application of the principles of warfare. Tactical units are widely dispersed and have responsibility for wide fronts of considerable depth. This sprawling and scattered deployment of forces and the absolute necessity for a unit to respond quickly, increases command and control as well as surveillance and target acquisition problems.

b. Lack of vegetation and natural concealment plus the similarity and uniformity of terrain increase the need for concealment. Artificial means of camouflage to include both man-made (nets, dummies, etc.) and electronic deception will be used extensively in order to obtain surprise. Battlefield surveillance must extend over large areas in front, behind, and to the flanks of the unit concerned.

c. FM 31-25 contains detailed information on desert operations, the employment of the arms and services, and training.

4-14. Jungle Operations

a. Combat in jungles is conducted at extremely close quarters by small numbers of troops. Dense foliage affords ideal concealment and permits raids, ambush, infiltration, and guerrilla warfare. Tight security measures are mandatory.

b. Communication and hence STANO communication nets are impaired by heavy vegetation and

irregular terrain. Obstacles to communication can be minimized significantly by—

- (1) Use of antenna expedients to increase operating range.
- (2) Placing antennas above foliage.
- (3) Use of wire and cable communications.
- (4) Airborne radio retransmission stations.
- (5) Foot messengers.
- (6) Airdrop and air pickup.

c. Heat, humidity, and heavy rainfall cause maintenance problems. Daily preventive maintenance is mandatory.

d. FM 31-35 contains detailed information on the characteristics of jungles, the employment of the arms and services, and training.

4-15. Mountain Operations

The operation of STANO systems in mountain areas will be restricted in most cases. Effective and reliable communication is difficult because of terrain obstacles. Proper siting of radio equipment, special auxiliary antennas, automatic radio retransmission, and radio repeater stations can all be used to great advantage. But, because the rate of travel normally is slower in mountainous terrain, cable or wire trunk circuits may have to be used. FM 31-71 and FM 31-72 provide detailed information on mountain operations.

4-16. The Night Environment

a. General.

(1) Illumination levels at night directly affect the selection of courses of action for the conduct of night operations. Night operations should be conducted when light levels provide maximum advantage to friendly units with night vision devices. Night vision devices which do not use artificial illumination (passive devices) increase night vision under most illumination levels. Infrared (IR), pink, or visible illumination can be used in conjunction with night vision devices to improve an individual's capability to see. Use of these illumination sources (active systems) have disadvantages in that the infrared and pink light systems have a signature effect and may be detected by an enemy equipped with infrared devices. Also, visible artificial illumination often aids the enemy as well as the friendly force.

(2) From a visibility viewpoint, night operations should be conducted at those times when the difference in visual capability between friendly and enemy forces is greatest and in favor

of friendly units. When conducting night offensive operations against an enemy not equipped with night vision devices, the preferred illumination level is less than that provided by a full moon on a clear night. This level provides the greatest difference in visual capability between friendly forces equipped with night viewing aids and an enemy without these devices. As a guide, night attacks are best conducted under an illumination level equivalent to that afforded by a quarter moon in a clear sky.

(3) Fog, haze, precipitation, smoke, and dust reduce human vision even when aided by night viewing devices. These conditions provide varying degrees of concealment from ground and air observation, and normally favor an attacker regardless of whether the defending force is equipped with night viewing devices. Night attacks by friendly forces under these conditions cannot fully exploit the capabilities of night vision aids. Clear nights will enable units equipped with night vision devices to operate with near day efficiency against forces which are not equally equipped.

(4) On the whole, where the night vision capability of two forces is equal, relatively good night visibility favors the defender by permitting him to observe the approach of the enemy and to fire upon him with maximum effectiveness.

b. Twilight.

(1) Twilight is transition from day to night (dusk) and from night to day (dawn). The beginning of morning nautical twilight (BMNT) and the end of evening nautical twilight (EENT) are the beginning and end, respectively, of enough light for limited visibility without the use of night viewing equipment. The beginning of morning civil twilight (BMCT) and the end of evening civil twilight (EECT) are the beginning and end, respectively, of enough light from the sun for daylight operations.

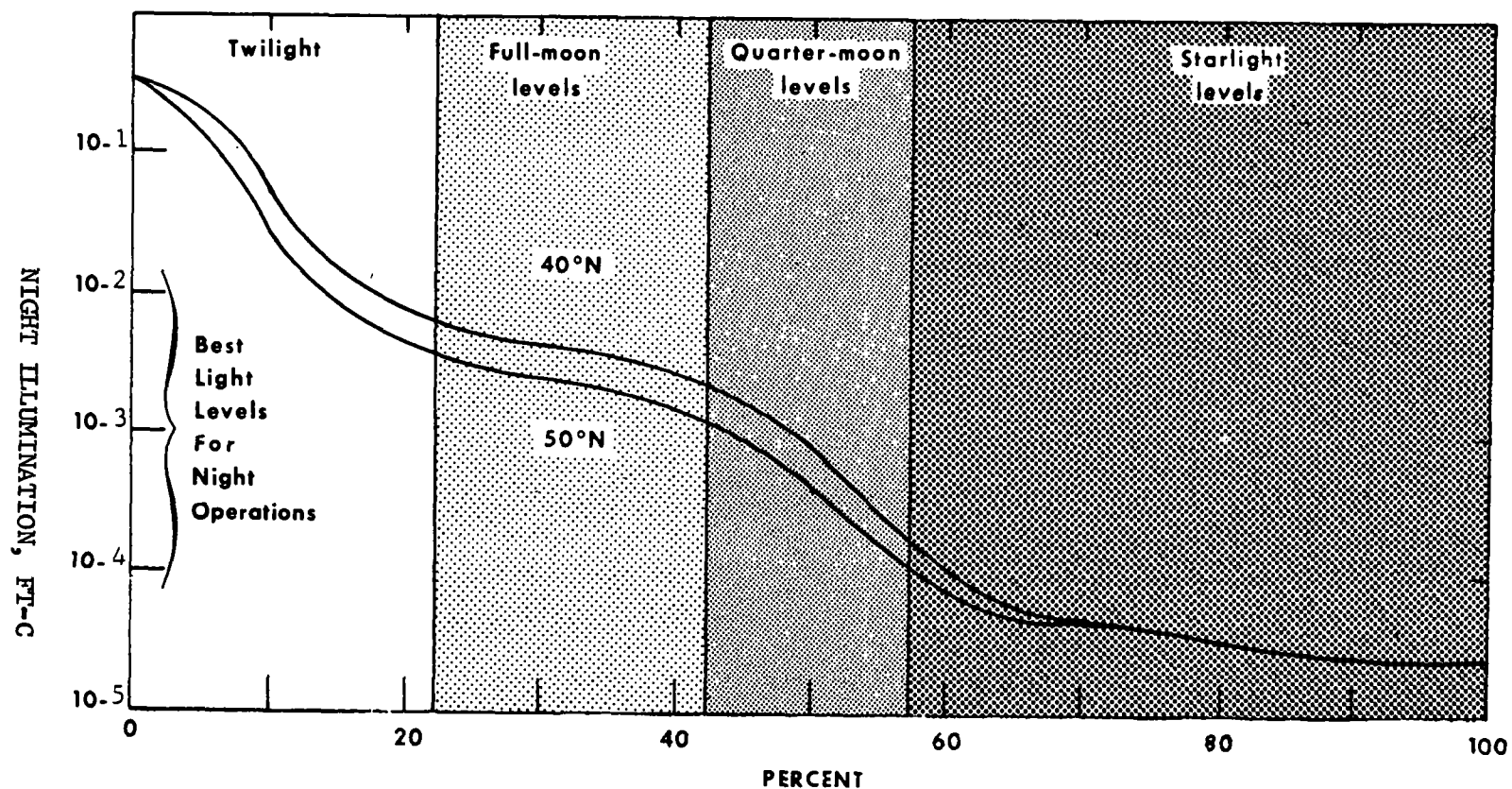
(2) During twilight, more light is received from the sun than from nocturnal sources such as the moon and the night sky even though the sun is below the horizon. This is because of the scattering of the sun's rays by the earth's atmosphere. True night is the condition when no light is being received from the sun other than that reflected by the moon and planets. In general, anywhere on earth and anytime during the year, the length of true night is about 3 hours less than the time interval between sunset and sunrise.

c. Sources of Natural Night Illumination.

(1) *General.* In the absence of all artificial

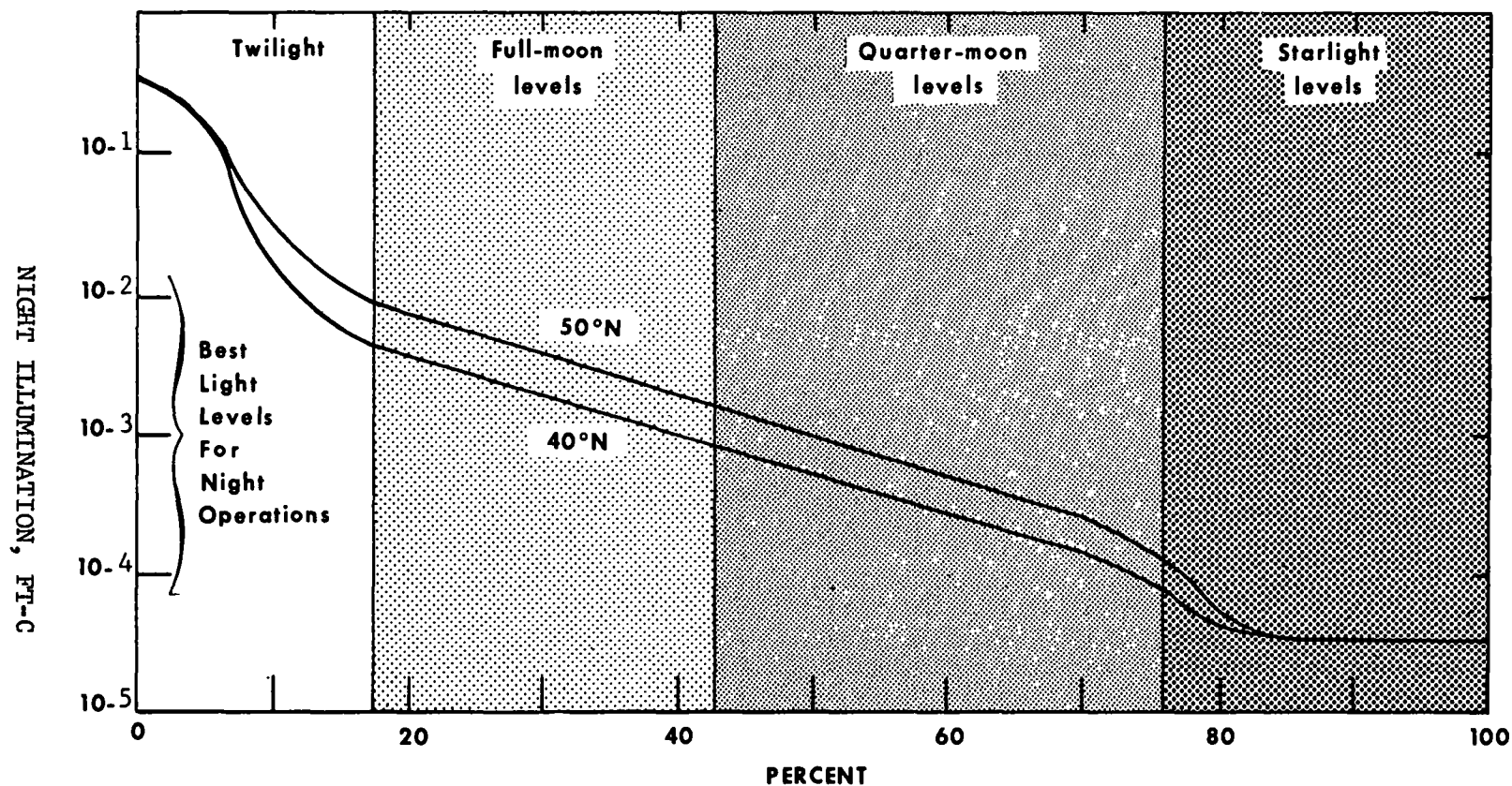
lighting (direct or scattered), there are two sources of natural illumination at night, moonlight and the light of the night sky. They differ in both quality and quantity. The night sky provides only one ten thousandth (10^{-4}) of a foot-candle of illumination, whereas on a clear night the total illumination received on the earth's surface from both the moon and the night sky is about one hundredth (10^{-2}) of a foot-candle. One-foot candle is the level of illumination that is produced on a normal surface by a candle at a distance of one foot. One hundredth of a foot-candle (full moon) is relatively high for an individual using a starlight scope. At this level, he can see targets and terrain well at distances outward to the effective ranges of his individual weapon and farther with the crew-served weapon sight. As the level of illumination decreases (e.g., from full moonlight to quarter moonlight), so does the viewing distance of image intensifying devices. The relationship between foot-candles and other commonly accepted units such as twilight or moonlight is shown in figures 4-1 and 4-2. On the 40° North Latitude Line, it is seen that a full moon level corresponds to about one-hundredth of a foot-candle and that a quarter moon provides about one-thousandth of a foot-candle of illumination.

(2) *Light of the night sky.* Light of the (moonless) night-sky is a comparatively low but significant source of illumination. In order of importance it is made up of airglow, starlight, and zodiacal light. About three-fourths of the light of the moonless night sky comes from airglow. Airglow is composed of light emissions from various chemical elements in the high atmosphere above 70 kilometers. Light reaching the earth from the visible stars comprises 10 to 15 percent of the moonless night sky. About the same amount of light is provided by the zodiacal light, which is a faint scattering of sunlight from cosmic or interstellar dust particles. The intensity of the total light of the night sky (airglow, starlight, and zodiacal light) is about one-ten thousandth of a foot-candle on a clear night or only about one-hundredth of that received from the full moon. The first generation of passive night viewing devices (devices which do not use artificial illumination) is not as effective when light from the moon is absent. In general, viewing distances are reduced. However, they still afford a great visual advantage over an enemy not equipped with such devices. In many instances, viewing distances may be increased by providing very small amounts of artificial illumination from either searchlights or flares. In any case, a great visual advantage over the enemy is



Illumination levels: percentage time equal to or exceeded
in January for Northern Hemisphere.

Figure 4-1. Illumination levels: Percentage time equal to or exceeded in January for Northern Hemisphere.



Illumination levels: percentage time equal to or exceeded
in July for Northern Hemisphere.

Figure 4-2. Illumination levels: Percentage time equal to or exceeded in July for Northern Hemisphere.

obtained by using night vision systems even under minimal moonless night sky illumination conditions.

(3) *Moonlight.* Moonlight is the most important source of night illumination in terms of intensity. The moon, reflecting light from the sun, approximates a point source of illumination. By greatly multiplying the amount of existing illumination, passive night vision devices are very effective under moonlight conditions.

d. *Unaided Night Vision.* Dark vision, or the ability to see unusually well under very reduced levels of illumination, can be achieved by allowing little or no light to enter the eye for a period of approximately 30 minutes. During this period, chemical changes occur within the eye which cause the eye to become unusually sensitive to a small amount of light; therefore, an individual with dark vision can see well even in poorly illuminated areas. Dark vision is rapidly destroyed by exposure to normal and bright light levels; consequently, as a practical matter, the individual soldier on the battlefield cannot acquire and preserve maximum dark adapted vision. Therefore, the individual soldier usually can see only to the extent normally possible without benefit of dark adapted vision. Infrequently, such as on patrols where burning and exploding incidents are not encountered, individual soldiers may achieve a higher than normal degree of visual acuity at night. Under these circumstances, the individual soldier should avoid looking at all light sources, if possible. When not equipped with night vision devices, off-center vision and scanning observation procedures should be practiced, since off-center vision is more sensitive at low illumination levels.

e. *Length of the Night.*

(1) Anywhere on earth, throughout the year, exactly one-half of all hours are hours of relative darkness. Except at the time of the equinoxes when daylight and night everywhere equally divide the day, day and night are of unequal length. The length of the night (or day) at any spot on earth is a function of the latitude of that place and the time of year (fig 4-1 and 4-2). The night is always 12 hours long at points on the equator, and generally varies only a little more than an hour during the course of the year within the tropics near the equator. The variation in the

length of the night is considerable in the middle and high latitudes.

(2) For approximately half of the nighttime hours of any month in the mid-latitudes, the only natural source of nocturnal illumination is the light of the moonless night sky. Referring to figure 4-2, it is seen that full moon levels prevail only about 30 percent of the time at middle latitudes in July, and that light from the (moonless) night sky with reduced levels of illumination can be expected approximately 25 percent of the time.

f. *The Effect of Overcast.*

(1) Overcast can reduce light levels by a factor of 2 for thin overcast to a factor of 10 for dark heavy storm clouds. For example, in the latter case, the ambient illumination level on a night with heavy overcast will be only one-tenth of that available on a clear night.

(2) The effect of overcast on the light of a full moon is not significant compared to the much greater fluctuation caused by the moon's elevation above the horizon and its phase such as a quarter moon or half moon. Heavy overcast tends to diffuse moonlight by softening high contrast and filling in shadows somewhat. The effect of heavy overcast on the light of the moonless night sky is much more pronounced because of the much lower levels of illumination.

g. *Training.*

(1) Individuals should receive training with the night operating aids with which they will be equipped or with which they will operate. These include all the night operating aids discussed in this chapter and described in appendix B. This training should include techniques of operation, employment, and maintenance.

(2) When the soldier has attained proficiency with his particular night operating aid, the coordinated use of all night operating aids should be practiced at unit level. For example, employment and control of individuals using night vision sights for both individual and crew-served weapons in an infantry company should be practiced at squad, platoon, and company level.

(3) During field exercises and maneuvers, combined arms forces with supporting combat support and combat service support elements, employ night operating aids during night operations.



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CHAPTER 5

STANO DIVISIONAL ASSETS

Section I. INTRODUCTION

5-1. General

All organizations with a primary (specific) or potential (implied) surveillance or target acquisition capability perform STANO functions. All maneuver elements are considered to have at least an implied STANO mission. Field artillery and air defense artillery units which provide fire support have a specific STANO mission due to their continuous target acquisition effort. A unit may satisfy its STANO requirements through organic

STANO assets, through attached or supporting elements, or from adjacent or higher headquarters.

5-2. Scope

Subsequent sections will describe the STANO assets within the division and assets available from attached or supporting elements. STANO support from higher echelons will also be briefly described.

Section II. ORGANIC DIVISION ASSETS

5-3. General

STANO equipment at division level is one of the major contributors to the information needs of the commander, but it is not the only source of such information. Information is also produced by other elements of the intelligence subsystems of the Integrated Battlefield Control System (IBCS) such as—

a. Signal intelligence (SIGINT) resources can assist friendly forces to detect and exploit enemy electromagnetic devices including radio and radar. SIGINT can provide significant target acquisition and surveillance information on a timely basis and extend the depth of information-collection operations and contribute to long-range target intelligence. SIGINT is an all weather, 24-hour continuous operation, unique and highly reliable source of target development information, and may be used to alert other more precise target acquisition resources, or to confirm information obtained from other sources. Electronic warfare support measures (ESM), although not a part of the Intelligence Subsystem, will also contribute to the information and target acquisition needs of the commanders.

b. HUMINT information-collection activities are designed to obtain information from human

sources such as prisoners of war, defectors, agents, or informants, and documents produced and used by enemy forces. A prime source of HUMINT information is the local populace which contributes intelligence information. Intelligence-collection activities utilizing HUMINT resources are an integral part of any surveillance and target intelligence plan, and can be used to alert other surveillance or target acquisition means or confirm reports obtained by other means.

5-4. Division STANO Assets

a. The armored cavalry squadron participates in surveillance, reconnaissance, or security missions such as flank guard, rear guard, covering force, or screening force. Armored cavalry units are able to perform offensive, defensive, or retrograde actions and in an economy-of-force role, and also have the capability to function as maneuver units in stability operations (FM 17-36). The armored cavalry squadron is equipped with the following STANO or STANO-related equipment:

(1) *Ground.*

Night vision sights; individual and crew-served weapons.

Searchlights, infrared and visible light.

Metascope.

Periscopes, electronic and optical.
Binoculars, electronic and optical.
Night observation device, (NOD).
Radar.

Infrared viewers.

Unattended ground sensors and receiver/
monitors.

Laser rangefinder.

(2) *BASS III*. Various elements of the battle area surveillance system, Phase III (*BASS III*) will be integrated into existing STANO assets at all levels of command from division to battalion. The system is built upon common modules and provides a wide-area UGS surveillance capability to the concerned commander through the use of remote relays. Components of the system include:

(a) Phase III sensors (many of which are commandable);

(b) Phase III portatales and associated event recorders for battalion use;

(c) Multichannel receiver units and associated sensor display units for brigade and division use;

(d) FM/FM relay package or multichannel universal relay packages (MURP) for relay sub-systems;

(e) Long-range navigation equipment;

(f) Remotely controlled munitions detonation units, and

(g) Command systems.

Personnel will be provided by the division combat surveillance company of the MI Bn (Cbt). The *BASS III* system is capable of monitoring all unattended ground sensors within RF range of its relay site and controlling/commanding those sensors equipped with a command receiver.

(3) *Air*.

Night vision sights, individual and crew-served weapons.

Metascopes.

Binoculars, electronic and optical.

Searchlights, infrared and visible light.

Night fire control and observation systems employing image intensification and thermal imaging techniques.

b. The division combat aviation (i.e., group, battalion, or company) can provide aerial reconnaissance support through the employment of organic aircraft. STANO operations such as the aerial delivery and monitoring of unattended ground sensors, airborne personnel detector operations, and battlefield illumination are capabilities of this organization (FM 1-15). The aviation bat-

talion is equipped with the following STANO or STANO-related equipment:

Night vision sights, individual and crew-served weapons.

Searchlights, infrared and visible light.

Night fire control and observation systems employing image intensification and thermal imaging techniques.

c. Division field artillery provides surveillance and target acquisition capabilities through ground surveillance radar, countermortar radar, and forward observers (FM 6-140). The capabilities are present in either the target acquisition platoon of the headquarters and headquarters battery of division field artillery, or the direct support field artillery battalions. The division field artillery is equipped with the following STANO or STANO-related equipment:

Radar.

Infrared viewers.

Night observation device, (NOD).

Binoculars, electronic and optical.

Battery commander's scope.

Laser rangefinder.

Night vision sights, individual and crew-served weapons.

Unattended ground sensors and receivers/
monitors.

d. The military intelligence battalion (combat) functions in direct support of the division intelligence system by employment of battlefield information and control centers/battlefield information centers (BICC/BIC) at division headquarters and selected headquarters of subordinate elements of the division to interpret unattended ground sensor and photographic imagery, to perform ground surveillance radar and unattended ground sensor monitoring, to provide administrative and limited logistical support to subordinate and attached elements, and to train assigned elements. The military intelligence battalion (combat) is composed of a headquarters and headquarters company, a direct support company, and a combat surveillance company. The personnel of the direct support company and the combat surveillance company are under the operational control and staff supervision of the G2/S2 at the respective BICC/BIC. (See paragraph 6-11 for further explanation of the organization of the military intelligence battalion (combat).) The military intelligence battalion (combat) is equipped with the following STANO and STANO-related equipment:

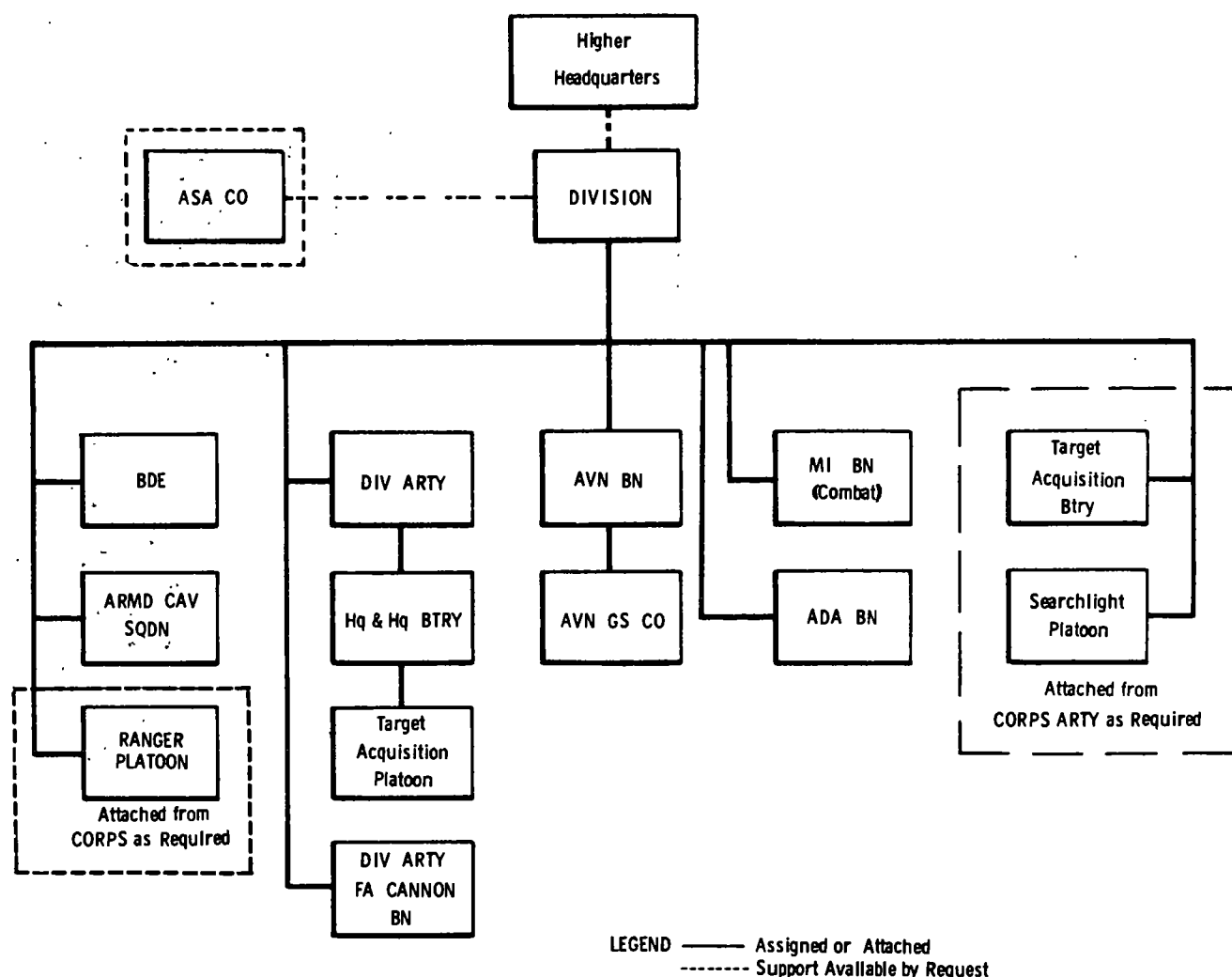


Figure 5-1. Major STANO assets, division organization relationship.

Radars.

Night observation devices.

Battery commander's scope.

Binoculars, electronic and optical.

Ground sensor terminals for both aerial radar and infrared imagery.

Laser rangefinders.

Telescopes.

e. The air defense artillery battalion provides surveillance and target acquisition capabilities through forward area alerting surveillance radars, visual observers, and the liaison section personnel at HAWK battalion or air defense artillery group level. Information supplied by the radars and liaison section would be air threat and ground target oriented. The radar and liaison section capabilities are present in the headquarters and headquarters battery of the ADA battalion; the visual observer capability is present in the Chaparral

and Vulcan batteries of the battalion. The ADA battalion is equipped with the following STANO or STANO-related equipment:

Radar.

Binoculars, optical.

Night vision sights on individual and crew-served weapons.

5-5. STANO or STANO-Related Assets Available Through Attachment or Direct Support
(Fig. 5-1)

Some assets required by the division are not organic, but are provided by higher headquarters either routinely or in accordance with special mission requirements. Units or personnel which are frequently attached or placed in direct support of the division are:

a. Military intelligence specialists provided from higher echelons to provide assistance to the G2 in the specialized fields of counterintelligence, interrogation of prisoners of war, and document translation.

b. A target acquisition battery from the corps field artillery target acquisition battalion may be attached or placed in direct support of the division field artillery. The target acquisition battery provides counterbattery information from its flash ranging, sound ranging, and counterbattery radar platoons. The target acquisition battery is discussed in detail in FM 6-120.

c. A searchlight platoon from the corps artillery searchlight battery may be provided to the division to provide a long-range searchlight illumination and infrared capability. The mission and techniques of employment of the searchlight platoon are contained in FM 6-115.

d. A patrol platoon from the corps ranger com-

pany may be attached to provide long-range ground reconnaissance and surveillance support for the division. (See FM 31-18 for a discussion of the ranger company.)

e. An Army Security Agency company from the corps Army Security Agency Battalion normally is placed in direct support of the division and furnishes SIGINT and EW support. The support rendered by this company is not limited to its organic resources, but includes resources available through direct access to capabilities of higher and adjacent echelons.

f. In addition to the above units which are attached or placed in direct support of the division, additional resources from higher headquarters are made available to the division on a single mission basis. An example of this support is the routine processing and execution by higher headquarters of the division's requests for aerial reconnaissance or surveillance support.

Section III. BRIGADE ASSETS

5-6. General

The brigade functions as a tactical control headquarters with maneuver units and supporting elements attached or in direct support on a mission basis. As a major subordinate command element within the division, the brigade executes the division's combat mission. The majority of STANO assets in the brigade are organic or attached to maneuver battalions and supporting elements. Brigade plans the employment of unattended ground sensors and supervises the monitoring activities. Frequency management remains a responsibility of division. Brigade monitors sensor fields through a monitoring capability provided by the division military intelligence battalion (combat).

5-7. STANO or STANO-Related Assets at Brigade

At brigade level, STANO or STANO-related assets include—

Unattended ground sensors with receivers/monitors.

Binoculars, electronic and optical.

Night vision sights, individual and crew-served weapons.

Metascopes.

Searchlights.

Radar.

Infrared viewers.

5-8. Separate Brigade STANO or STANO-Related Assets

Separate brigade STANO or STANO-related assets include the following—

a. The armored cavalry troop of the separate brigade provides ground reconnaissance and surveillance through the employment of its ground reconnaissance elements. The troop is equipped with night vision devices, ground surveillance radar, and unattended ground sensors (FM 17-30, 17-36).

b. The field artillery battalion of the separate brigade provides surveillance and target acquisition capabilities through its forward observers, counter mortar and ground surveillance type radars (FM 6-140).

c. Military intelligence specialists assist the S2 in the specialized fields of order of battle, imagery interpretation, interrogation of prisoners of war, document translation, and counterintelligence (FM 30-9).

d. In a separate brigade, an aviation company provides aerial reconnaissance support through employment of its organic aircraft.

e. An air defense battery (augmentation) attached to a separate brigade provides surveillance and target acquisition capabilities through its vis-

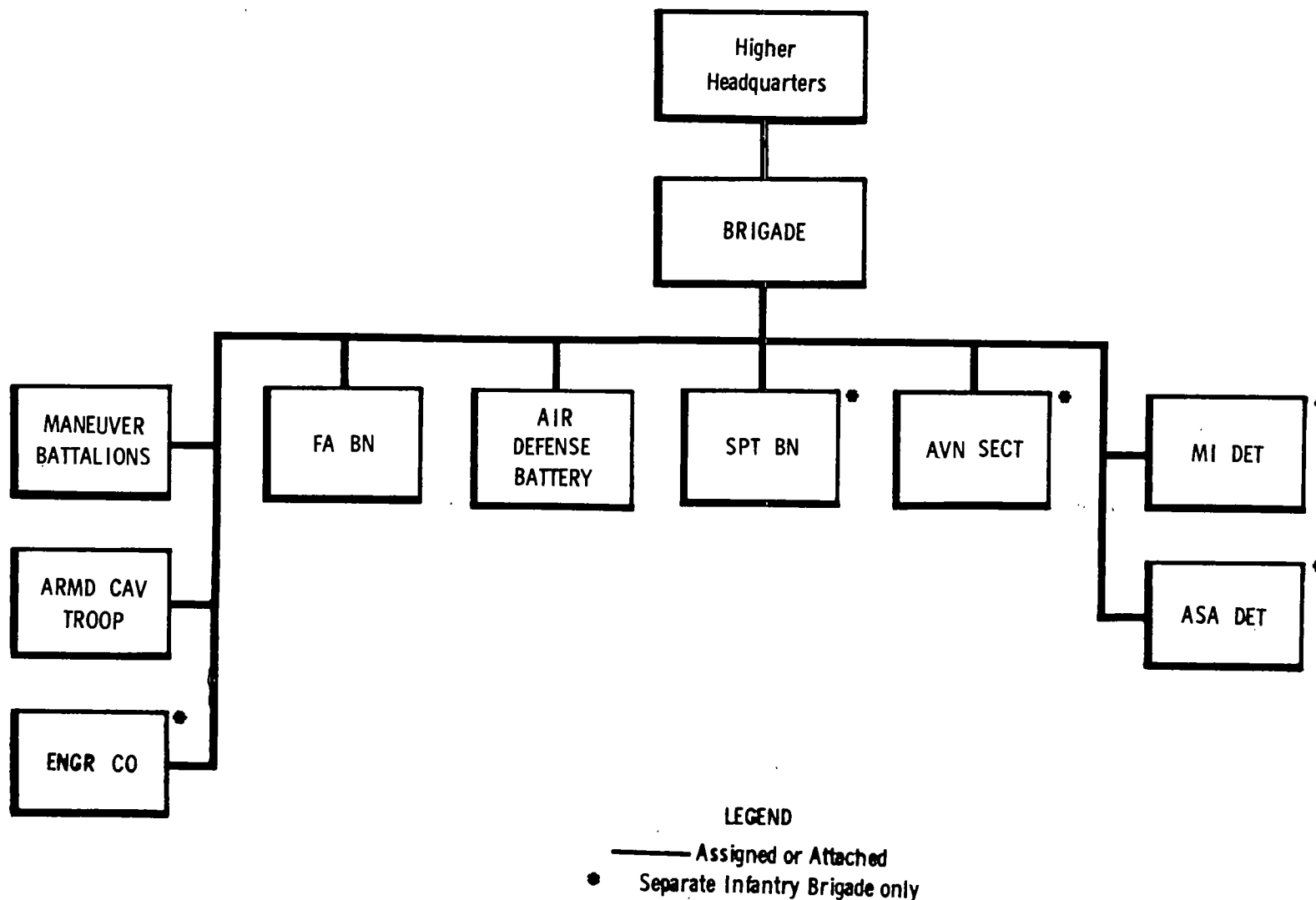


Figure 5-2. Major STANO assets, brigade organization relationship.

ual observers and the forward area alerting radars.

5-9. STANO Assets Available Through Attachment or Direct Support (Fig. 5-2)

Any or all of the assets listed above as organic to the separate brigade may be attached or placed in direct support of the divisional brigade, as required by the brigade's mission. Additional corps-level assets in support of the division may

be further attached or placed in direct support of the brigade. Such units include searchlight platoons or sections (FM 6-115) and long-range reconnaissance ranger patrols (FM 31-18). The Army Security Agency detachment provides SIGINT, and ESM support to the separate brigade. Brigades within divisions receive such support from elements of the ASA divisional support company. In providing this support, the ASA detachments and companies have direct access to capabilities of higher and adjacent echelon SIGINT/SIGSEC/EW resources.

Section IV. BATTALION ASSETS

5-10. Infantry Battalion

The infantry battalion is the basic tactical and maneuver unit which can be employed in a variety of combat missions.

5-1. Infantry Battalion STANO or STANO-Related Assets

These include—

- Night vision sights, individual and crew-served weapons.

- Metascopes.

- Radar.

- Searchlights.

- Unattended ground sensors with receivers/monitors.

- Binoculars, electronic and optical.

- Night observation device, (NOD).

- Laser rangefinder.

- Battery commander's scope.

- Infrared viewer.

5-12. STANO Assets Available Through Attachment or Direct Support

Any of the STANO assets of the division may be attached or placed in direct support of the infantry battalion for a mission which requires such support. (See fig 5-3 for STANO assets, battalion organizational relationship.)

5-13. Tank Battalion

The tank battalion uses fire, maneuver, and shock action to close with and destroy the enemy in coordination with other combat arms (FM 17-15).

5-14. Tank Battalion STANO or STANO-Related Assets

These include—

- Night vision sights, individual and crew-served weapons.

- Binoculars, electronic and optical.

- Searchlights, infrared and visible light.

- Periscopes, electronic and optical.

- Metascope.

- Telescope.

- Radar.

- Infrared target indicator.

- Unattended ground sensors with receivers/monitors.

5-15. STANO Assets Available Through Attachment of Direct Support

Any of the STANO assets of the division may be attached or placed in direct support of the tank battalion for a mission requiring such support.

5-16. Field Artillery Battalion

The field artillery battalion provides fires in direct support of maneuver battalions (tank or infantry) (FM 6-20-1).

5-17. Field Artillery Battalion STANO or STANO-Related Assets

These include—

- Night vision sights, individual and crew-served weapons.

- Radar.

- Binoculars, electronic and optical.

- Laser rangefinder.

- Target locator, infrared.

- Unattended ground sensors with receivers/monitors.

- Battery commander's scope.

- Night observation devices, (NOD).

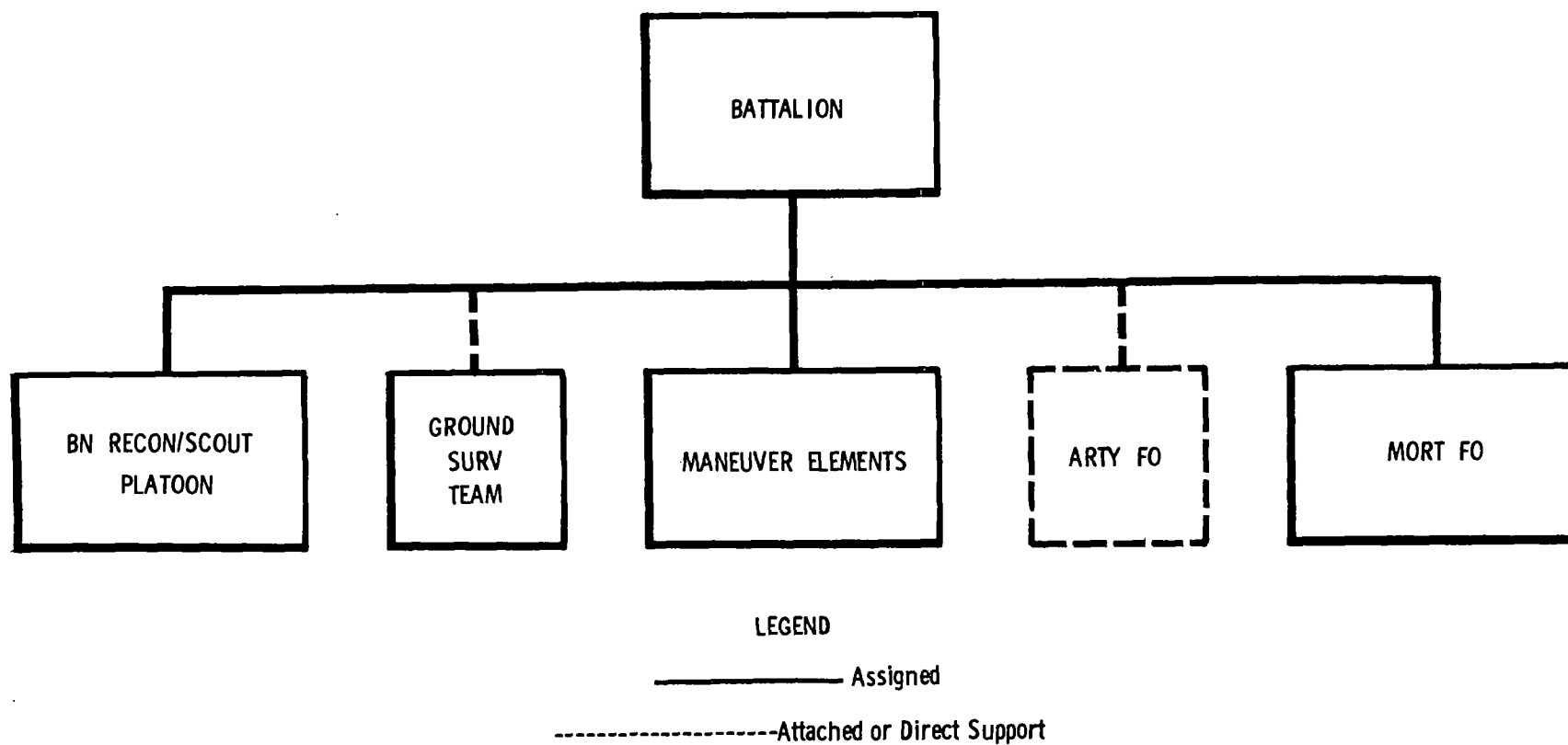


Figure 5-3. STANO assets, battalion organization relationship.

5-18. STANO Assets Available Through Attachment or Direct Support

Any of the STANO assets of the division may be

attached or placed in direct support of the field artillery battalion for a mission which requires such support.

Section V. COMPANY/BATTALION/TROOP ASSETS

5-19. General

The company and the troop are the basic tactical elements in their respective battalion-size organization, and the battery is the basic firing unit of the artillery battalion.

5-20. Company, Battery, and Troop STANO or STANO-Related Assets

These are similar to the STANO or STANO-related assets at battalion/squadron level. Any STANO assets within the division which are capable of accompanying a company-size unit may be attached or placed in direct support of the unit when the mission requires such support.

CHAPTER 6

ORGANIZATION FOR STANO OPERATIONS

Section I. GENERAL

6-1. Introduction

Combat support units are provided to the maneuver battalions as required to assist in the accomplishment of STANO related missions. These units may be organic, attached, in direct or general support or under the operational control of the battalion or its higher headquarters. This chapter is applicable to those nonorganic units which normally provide combat support to the maneuver battalions.

6-2. Combat Support Elements

a. Organic Elements. The organic combat support elements of the infantry battalion are the reconnaissance/scout platoon, the communication platoon, the heavy mortar platoon, and the anti-tank platoon. The tank battalion has similar combat support less the antitank platoon. The armored cavalry squadron has a similar structure less the scout, heavy mortar and antitank platoons. (The ground surveillance section previously located in the combat support company of an infantry battalion will now be organized within the combat surveillance company of the MI battalion (combat). (See para 6-11d.)

b. Nonorganic Elements. The nonorganic combat support elements normally available to support a maneuver battalion are Army aviation, intelligence, chemical, engineer, artillery, military police, and communications elements. The battalion may also receive combat support from other

Services such as naval gunfire, tactical air support, signal intelligence, and electronic warfare resources available to the division or brigade. When gunfire or air support is provided by other Services, a forward air controller or a naval gunfire liaison officer normally is present to coordinate the support. The U.S. Army Special Forces Group, which normally operates in support of the unified command, has resources in the form of friendly guerrilla units or unilaterally employed special forces units which can be of value to the G2/S2 at division or brigade. These elements, when operating within the field army's area of interest, may employ STANO devices either unilaterally or in concert with other intelligence sources to assist in monitoring the movement of enemy forces and the location of enemy fire support means.

6-3. Employment of Combat Support

a. Commanders must employ combat support units to make maximum use of their capabilities.

b. Four factors which must be considered prior to employment of combat support resources are mission, enemy, terrain and weather, and troops available (METT).

6-4. Specific References

For a detailed discussion of combat support of armor and infantry elements, see field manuals of the 7- and 17-series.

Section II. STANO INFORMATION NEEDS

6-5. Division

a. The intelligence planning at division in preparation for combat is based on plans and directions of the next higher headquarters. The same planning phases are applicable, although the preliminary phase will be considerably shortened. In

addition to absorbing and disseminating the intelligence made available as a result of intelligence activities of higher headquarters, the division G2 develops intelligence requirements, submits requests for additional support from higher headquarters and other service assets, levies requests

for information, and exploits any other sources available to him. In view of the reduced time available to prepare for combat, the division G2 must insure that he is always informed on current planning at the next higher echelon.

b. At division level, surveillance requirements are characterized by the immediacy of operations. Continuous surveillance is required to obtain information of movements into or within the area of influence, enemy dispositions, employment of supporting weapons, electromagnetic emissions, nuclear detonations, CBR or air threats, weather, and topographical features. Periodic area surveillance is required for general information of the enemy and terrain to supplement current general intelligence. During fluid situations, continuous area surveillance is required. During static situations, periodic coverage of the area may suffice.

6-6. Brigade

a. Because of the size of the brigade and its area of interest there will be a reduction in the number of operational plans and planning lead-time. Normally, operational planning at the brigade level is more dynamic than at higher levels.

b. At brigade, surveillance requirements are characterized by the immediacy of operations. During fluid situations, continuous surveillance is required to obtain information on movements into or within the area of influence, disposition of enemy units and supporting weapons, electromagnetic emissions, nuclear detonations, CBR, and air threats. During static situations, periodic coverage of the area may suffice.

6-7. Battalion

The requirements for intelligence planning and surveillance within the battalion essentially are the same as those of the brigade, but with a greater emphasis on informal, rapid planning and continuous surveillance.

6-8. Company

At the company level, STANO information needs are similar in nature to those of the battalion, but are characterized by greater informality and rapidity in planning, and continuous surveillance by all means available.

Section III. ROLE OF THE BICC/BIC SYSTEM

6-9. General

a. The BICC at each command echelon from battalion through corps, including separate brigades, supports the G2/S2 staff by screening all incoming intelligence data, integrating information received from all sources, expediting the processing of data and its transmission to other interested echelons, and producing intelligence for the commander and the supported G2/S2 staff. The BICC also tasks, coordinates and manages, for the intelligence staff officer, all collection means organic to or supporting the echelon concerned. All BICC are interconnected with communications and integrated with fire support channels and the division area communications systems. To insure responsiveness to the commander, each BICC is under the staff supervision and operational control of the G2/S2 of the supported echelon. BICC support assists in the accomplishment of the tasking, collection, production, and dissemination functions.

b. The battlefield information center (BIC) provides support to the field artillery intelligence effort of the command. It coordinates, but does not

control, the intelligence and target acquisition effort of the artillery unit it supports. The BICC/BIC system speeds the flow of information and intelligence between the supported command and the field artillery and assists the command intelligence section in the coordination of the field artillery intelligence collection effort with the total command intelligence effort. An artillery BIC operates at each division artillery direct support battalion. The BIC transmits to and receives spot reports from the command BICC; it does not become involved in the actual processing of intelligence.

c. The commander relies on the G2/S2 of his staff for the combat intelligence he requires. The G2/S2, in turn, uses the BICC as a managerial tool to fulfill the commander's needs. The BICC/BIC system does not disturb the internal organization of the G2/S2 staff at any level, nor does it alter the responsibilities of the commander, other staff officers, and subordinate commanders. The G2/S2 and his staff will exercise supervision over the BICC in much the same way that he currently does over the military intelligence support personnel working in the intelligence staff section.

d. The BICC is organized into a collection, control, and dissemination section (CC&D), and analysis and production section (A&P) (not found at the battalion BICC), and a BICC air section (di-

vision and corps only). Each BICC has its own communications means connected to other BICC and its own message center (at brigade and higher echelons).

Section IV. ROLES OF THE G2/S2

6-10. Division and Corps

a. The commander's management of the division or corps intelligence effort is the direct staff responsibility of his intelligence officer, the G2. Normally, the G2 does not become directly involved in intelligence production procedures. He uses 85 to 90 percent of his time in supervising the integrated command intelligence system. He obtains the commander's approval of EEI and advises the commander and staff on intelligence matters. G2 staff functions interface with and impact on all functional area descriptions (FAD), including collection management. Based on developments in the command's tactical operations, the G2 establishes overall collection requirements which are in turn used by the collection management analysts of the BICC CC&D section as guides in assigning priorities to individual collection requests. The G2 insures proper implementation of these priorities by approving the basic collection plan and periodically checking changes to the plan. He anticipates intelligence requirements and controls production and dissemination of intelligence by reviewing, modifying, and approving intelligence documents and reports produced by his staff and the BICC. He notifies the commander of significant new intelligence developments, particularly if they result in answers to EEI or a change to the intelligence estimate, or have an immediate impact on tactical operations in progress.

b. The G2 delegates specific responsibilities to and supervises and provides guidance for his staff on a day-to-day basis. Further, he exercises operational control over the division/corps BICC. To

insure proper distribution of effort, he assigns priorities to and within these areas of responsibility. Primary management tools are the command's intelligence SOP and the G2 SOP, which are prepared and revised by the G2 plans branch at the direction of the G2. These SOP are used by appropriate intelligence personnel as basic guidance. These SOP may establish report formats, frequencies, and distribution; assign specific responsibilities; and delineate relationships and stipulate coordination requirements. The G2 SOP establishes file management procedures to insure an efficient filing system with sound retrieval capabilities. The G2 maintains the operational effectiveness of his staff and the BICC by determining (with the assistance of his plans branch) the requirements for augmentation of personnel, equipment, and facilities, and requesting such augmentation when required. He also participates in staff conferences and briefings. He schedules and personally participates in liaison visits for the purpose of exerting his personal influence on the solutions to problems and increasing the effectiveness of the command intelligence system.

c. The major difference between S2 management at brigade/battalion (including separate brigade) and G2 management at division/corps is the direct involvement of the S2 in the intelligence collection and production procedures. This direct involvement is necessitated by the limited size of the intelligence/BICC staffs at brigade/battalion. While general principles of management of the intelligence effort remain the same as those at higher command levels, the S2 provides closer personal supervision of the intelligence effort.

Section V. INTELLIGENCE ORGANIZATION

6-11. General

This section provides guidance on the organization of the military intelligence battalion, organic to the division.

a. *Military Intelligence Battalion (Combat)*. The MI battalion (combat) is an organic element of the division and operates under the staff super-

vision of the G2. The primary objective of the battalion is to provide management and necessary specialist personnel for the collection, processing, and dissemination of combat intelligence information obtained or developed in support of the division. The MI battalion (combat) provides the battlefield information and control centers (BICC) and battlefield information centers (BIC) in sup-

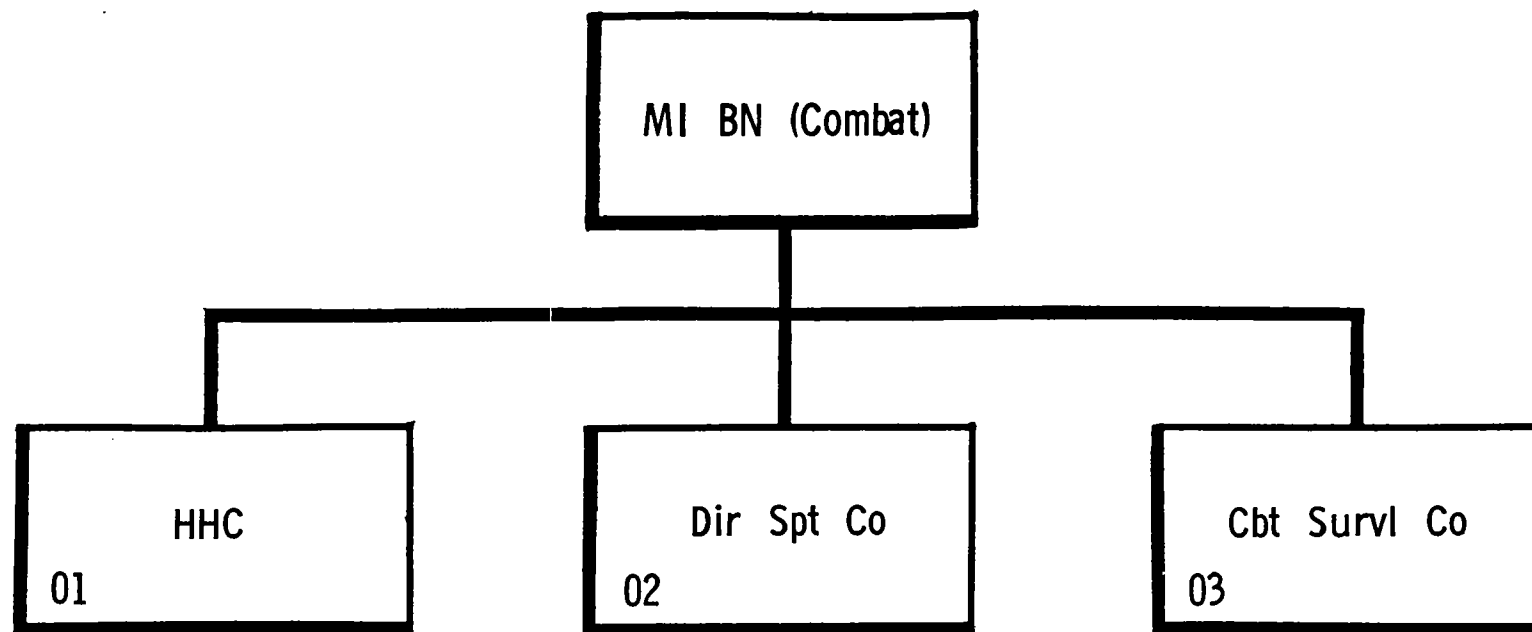


Figure 6-1. Military intelligence battalion (combat).

port of the division. It interprets sensor and photographic imagery, performs attended ground sensor surveillance and unattended ground sensor monitoring, provides administrative and limited logistical support to subordinate and attached elements, and trains assigned elements. The battalion consists of a headquarters company, direct support company, and a combat surveillance company (fig 6-1).

b. Headquarters and Headquarters Company (HHC). The mission of the headquarters and headquarters company (HHC) is to provide the necessary personnel to operate the various administrative, maintenance, communications, and logistic activities of the division MI battalion (combat). It also provides intelligence personnel to operate the division battlefield information and control center (BICC) and provides one ground sensor terminal to receive imagery signals from Mohawk airplane assets of corps in support of the division. A tactical imagery interpretation facility (TIIF) is provided to process, interpret and disseminate the information/intelligence collected from these aircraft.

c. Direct Support Company. The mission of the direct support company is to provide intelligence personnel and equipment to operate all the battlefield information and control centers (BICC) and the battlefield information centers (BIC) of the division, except the division BICC.

d. Combat Surveillance Company. The mission of the combat surveillance company is to provide ground surveillance teams to operate ground surveillance radars, and monitoring teams for the unattended ground sensors for the maneuver battalions of the division. These individuals are under the operational control of the respective maneuver battalion S2 (who are collocated with the BICC/BIC) and whose functions are to specify location for implementation, type of sensor, number of sensors in a string, mixes, and other critical data pertaining to the accomplishment of the mission. Employment of unattended ground sensors will be the responsibility of maneuver battalions and divisional field artillery personnel. It is envisioned that these combat surveillance company personnel from the MI battalion (combat) may also assist in implanting unattended ground sensors in conjunction with trained maneuver battalion personnel.

6-12. The Battlefield Information and Control Center/Battlefield Information Center (BICC/BIC)

a. In order to improve the military intelligence support system, a series of operational elements are organized to assist in the control and coordination of the intelligence functions of collection, production, and dissemination. These elements are designated battlefield information and control centers (BICC) and battlefield information centers (BIC). They are found in direct support and under the operational control of the intelligence staff officer at each echelon from battalion through division.

b. The battlefield information and control center (BICC) screens incoming data, integrates information received from all sources, expedites the processing of data and its transmission to other interested echelons, and produces intelligence for the supported G2/S2 staffs located at division, brigade and combat maneuver battalions. The BICC assists the G2/S2 with the coordination and control of the collection means organic to or supporting their respective echelons. These centers are interconnected with dedicated or common user teletypewriter and telephone circuits and secure FM voice radio and radio teletypewriter (RATT) nets. To insure responsiveness to the supported commander, each BICC is under the staff supervision and operational control of the intelligence officer of the echelon supported.

c. The battlefield information center (BIC) supports the armored cavalry and field artillery units. It differs from the BICC in that it does not directly assist the G2/S2 with the control of the collection resources of the supported units.

6-13. Organizations and Functions of the Battlefield Information and Control Center/Battlefield Information Center (BICC/BIC) System

a. Division BICC.

(1) The division BICC performs the intelligence functions of managing the collection effort, producing and disseminating information under the staff supervision and operational control of the division G2. The division BICC has the following two basic responsibilities:

(a) Assisting in the tasking and management of the collection effort within the entire division area.

(b) Expediting the flow of information and intelligence to the division commander and

his staff. At the division BICC, information obtained from all sources is fully integrated, and the current status of all specialized collection means organic to or supporting the division is maintained.

(2) The primary information collection sources are ground and aerial reconnaissance, surveillance and target acquisition units, and U.S. Army Security Agency (USASA) activities. Military intelligence units also provide counterintelligence support, the interrogation of prisoners of war, and document exploitation to obtain vital information which is of immediate tactical value. It is therefore necessary that the combat intelligence collection, control, coordination, and dissemination effort be centered in the BICC. The broad functions of a BICC include the following:

(a) Assist in the management of the combat intelligence collection effort.

(b) Coordinate the combat intelligence collection effort.

(c) Expedite the production of combat intelligence.

(d) Expedite the dissemination of combat intelligence.

(3) Operationally, the division BICC consists of three integral components: The collection, control and dissemination (CC&D) section, the analysis and production (A&P) section, and the BICC air section (fig 6-2). Supporting the BICC is an attached communications team from the military intelligence battalion (combat) communications platoon and an ASA SIGINT support element (SSE) from the ASA support company.

(a) *Collection, control, and dissemination (CC&D) section.* The CC&D section manages and coordinates the intelligence collection effort for the G2 and expedites the receipt, screening, and dissemination of information and intelligence. The section performs all the collection management functions assigned by the G2 to the BICC. It plans and supervises the collection effort, initiates collection requests, tasks collection agencies, and insures expeditious response to requests. The section maintains an availability status display of all collection means it manages and of other collection means which are organic to or in support of the division. It maintains a record display of the tasks currently assigned to these means and their status.

(b) *Analysis and production (A&P) section.* The A&P section performs an in depth analysis of information received by the BICC. The section records, evaluates, analyzes, and inte-

grates information; formulates conclusions; and produces intelligence. It maintains the intelligence data base for the division and records and integrates into the data base all combat intelligence developed. It receives information for processing from the CC&D section. The A&P section maintains order of battle maps and status boards for detailed analysis of order of battle information and for intelligence production. It provides the G2 section with order of battle intelligence for posting the enemy situation map. The A&P section formulates and prepares combat intelligence reports as required.

(c) *BICC air section.* The BICC air section is an integral part of the division BICC. It works in close coordination with the CC&D and the A&P sections of the division BICC and with the division G2 air. The chief of the BICC air section provides operational control and supervision of the imagery interpretation platoon of HHC, MI battalion (combat). The section provides the operational element to support the broad responsibilities of the G2 air. The work of the section falls into three main categories: Planning, collection, and processing the results of aerial R&S operations of the command. The chief of the BICC air section receives his staff supervision from the division G2 air.

(d) *Division G2 air branch.* The G2 air branch performs duties directly under the supervision of the division G2. The G2 air is responsible for supervising and monitoring the day-to-day activities of the BICC air section. The G2 air branch normally is located in the division tactical operations center (DTOC) and is an integral part of the tactical air support element (TASE) of the DTOC. It is responsible for the long-range aerial R&S planning. The G2 air works in close coordination with the G3 air and the tactical air control party (TACP). The detailed duties and functions of the division G2 air are as outlined in FM 30-5 and FM 30-20.

(e) *SIGINT support element.* The division BICC is supported by the SIGINT support element (SSE) of the USASA support company. The SSE is the interface between the BICC and the SIGINT community. It insures that intelligence, information, and requirements flow freely and expeditiously between the SIGINT community and the division.

(f) *BICC communications team.* The primary means of communications between the division BICC, the brigade BICC and the division artillery BIC are the sole user teletypewriter circuits provided by the division communications

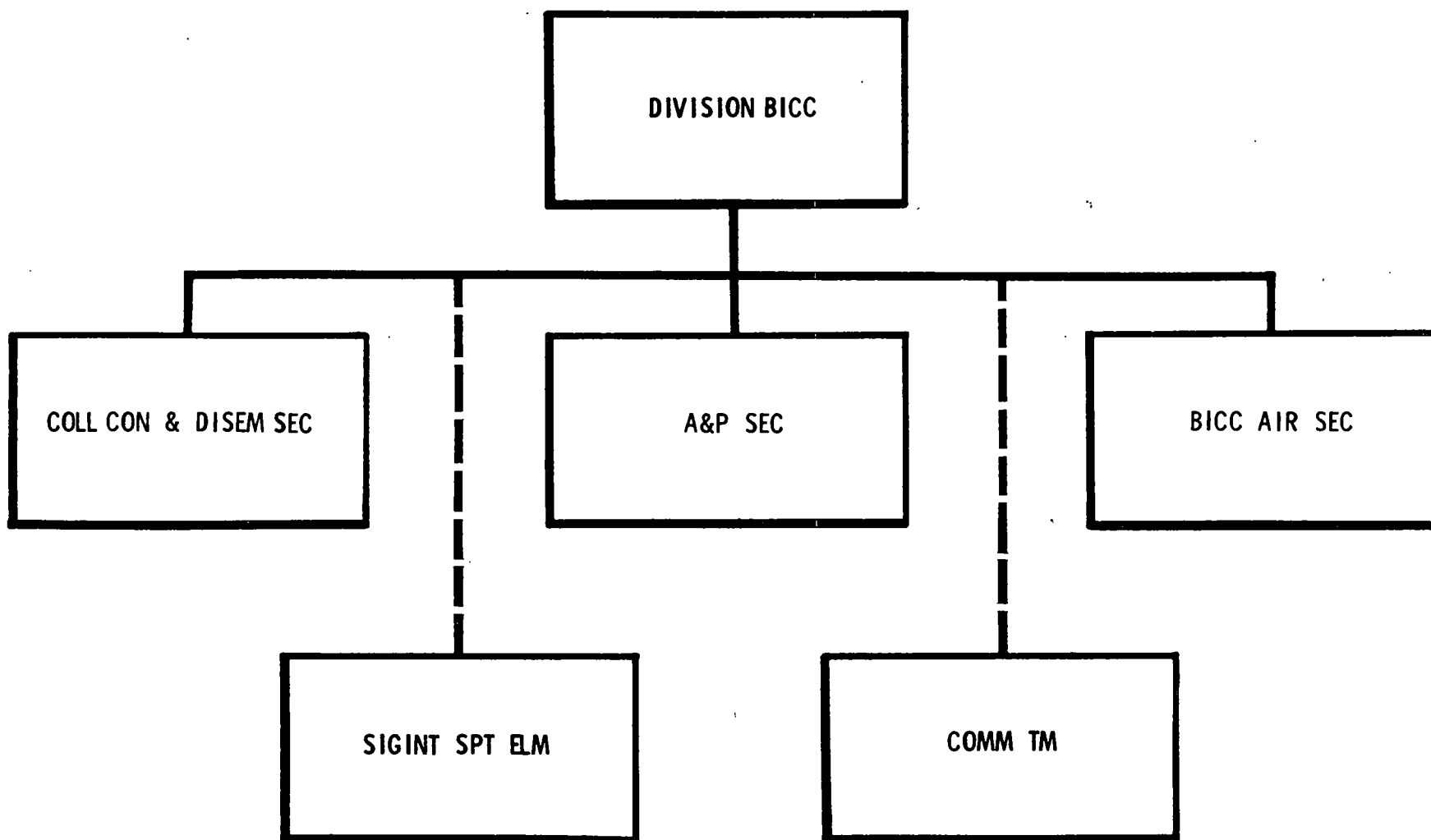


Figure 6-2. Division BICC.

system. The secondary means of communications is secure voice FM radio. Primary communications between the division BICC and the armored cavalry squadron BIC is provided by a secure radio teletypewriter (RATT) net. The division artillery BIC also has a station in this net, installed and operated by communications personnel of the military intelligence battalion (combat). The military intelligence battalion (combat) also provides communications personnel and a teletypewriter terminal for the HHT of the armored cavalry squadron; this teletypewriter terminal is used as an alternate means of communications to higher headquarters. Normally, the terminal is utilized when the HHT collocates near a division forward area signal center (FASC). Teletypewriter circuits are installed by personnel at the FASC.

(4) Division BICC relationships are as follows:

(a) *Relationship with division staff.* Since the division BICC is under the staff supervision and operational control of the division G2, the BICC assists the division staff in acquiring information. The coordination of operations with other staff sections is the responsibility and function of the G2 section.

(b) *Relationship with higher echelon staff.* If the means of satisfying combat intelligence requirements are not available within the division resources, they are requested by the G2 through the BICC of the next higher echelon. The BICC of the next higher echelon coordinates the execution of missions and notifies the division BICC. The higher echelon BICC is responsible for informing its G2 of pertinent information obtained from the division BICC.

(c) *Relationship with brigade and other staffs.* The division BICC does not deal directly with the S2 at brigade, division artillery, or armored cavalry squadron. Any information that the division BICC has for these staff sections is passed through BICC/BIC channels.

(d) *Relationship with higher echelon BICC.* The division G2 BICC responds to the collection requests of the higher echelon to which the division is assigned and is a part of that echelon's BICC/BIC net. Pertinent portions of the division collection plan are submitted to the higher echelon BICC for coordination and subsequent integration into the command's collection effort. The division BICC expedites the transmission of all pertinent information to the higher echelons. All division requests for intelligence collection support from the next higher headquarters are

passed to the higher BICC using BICC/BIC communications channels. The division BICC is informed of all missions in the division area of interest.

(e) *Relationship with other division BICC.* The division BICC passes to the BICC of adjacent divisions information that could have a bearing on their missions. This lateral coordination is performed via BICC communications. The same system of communications is used to coordinate with adjacent BICC when overlaps or gaps in the collection coverage are discovered. However, the next higher echelon BICC has the responsibility to see that measures are taken to resolve such deficiencies.

(f) *Relationship with brigade BICC.* The division BICC is directly concerned with the operations of the three brigade BICC. Each of the brigade BICC is in the division BICC communications net and responds as required to the collection tasks assigned by the division G2/BICC when execution of these tasks are within their capability. Coordinating the intelligence effort of the three brigades is a continuing task for the division BICC. The division BICC works through the brigade BICC when it is necessary to reach the battalion BICC, and the direct support artillery BIC when in support of a brigade.

(g) *Relationship with division field artillery BIC/S2.* The division BICC works closely with the BIC supporting the division artillery. The division artillery BIC has no organic target acquisition or surveillance means, and its collection responsibility is limited to information coordination and data handling. All artillery target acquisition and surveillance means remain under the control of the artillery. The division BICC, through the division artillery BIC, requests specific information from division artillery. The division artillery BIC coordinates these requests with the division artillery S2 who approves the tasking of artillery target acquisition units for the collection of the information when it does not jeopardize the artillery mission. If approval is not given, the division artillery BIC informs the division BICC, which selects other intelligence means for acquiring the information. If the artillery responds to the request, the division artillery BIC keeps the division BICC informed of the information as it is received. Target acquisition information obtained by the division BICC is disseminated to the division artillery BIC. The division artillery target acquisition plan is submitted by the division artillery BIC to the division BICC.

(h) *Relationship with armored cavalry squadron BIC/S2.* The division BICC works directly with the BIC supporting the armored cavalry squadron. When the primary mission of the squadron is reconnaissance, the squadron staff controls the squadron intelligence collection effort, and the relationship between the division BICC and the armored cavalry squadron BIC is similar to that between the division BICC and the division artillery BIC. As the emphasis on reconnaissance decreases, the assistance which the armored cavalry squadron BIC provides its supported S2 increases, and the relationship between the division BICC and the armored cavalry squadron BIC approaches that between the division BICC and the brigade BICC.

b. Brigade BICC.

(1) *Mission.* The mission of the brigade BICC is the collection, production, and dissemination of intelligence information in order to produce timely and valid combat intelligence and information for use as a basis for command decisions.

(2) *Functions.* The ability to produce timely and valid intelligence is a major factor affecting the value of intelligence. The brigade BICC is under the staff supervision and operational control of the brigade S2 in the production of intelligence in the four functional areas of collection, processing, reporting, and dissemination.

(3) *Organization.* The brigade BICC is an organic element of the direct support company of the division MI battalion (combat). The brigade BICC is organized into two major sections: The collection, control, and dissemination (CC&D) section; and the analysis and production (A&P) section (fig 6-3).

(4) *Operations.*

(a) *General.* The brigade BICC is the lowest level BICC capable of the integration of all available information for the production of intelligence. The intelligence production capability of the brigade BICC is not as sophisticated as that of the division BICC, but it does provide adequate intelligence support to the brigade S2. The brigade BICC is the net control station (NCS) for the brigade BICC intelligence net. In addition, it is a subscriber to the division BICC intelligence net. These channels are used to transmit combat intelligence information. The brigade BICC has two basic responsibilities: It assists in the management of the collection effort within the entire brigade area; and it expedites the exchange of combat intelligence and information among the

brigade commander, the maneuver battalions, the DS artillery battalion, the adjacent brigades, and the division. The brigade BICC functions as the intelligence collection, production, and dissemination element in direct support of the brigade S2. The brigade BICC receives, coordinates, and integrates into the brigade collection plan the target acquisition plan of the DS artillery battalion, the collection plans, the STANO plan, and coverage capabilities of the maneuver battalions. It receives collection requirements through BICC/BIC channels and develops them for the brigade S2 into tasks to be levied on the BICC and BIC of subordinate units or into requests to adjacent and higher headquarters. The brigade BICC contains two sections, the CC&D section and the A&P section.

(b) *Collection, control, and dissemination (CC&D) section.* The CC&D section assists the brigade S2 in the same way that the CC&D section at division performs for the G2. (See para a(2)(a) above.) The CC&D section is the hub of the brigade intelligence communications. The CC&D section receives all incoming intelligence information and disseminates all outgoing combat intelligence information. If it does not have the immediate capability to process the information, the CC&D section passes the information to the analysis and production section.

(c) *Analysis and production (A&P) section.* The A&P section performs the intelligence processing and production function of the BICC. Its functions are the same as those described for the A&P section of the division BICC. (See para a(3)(b) above.) It provides the S2 section with the order of battle map and the enemy situation map. The A&P section formulates and prepares combat intelligence reports.

(5) *Brigade BICC relationship.*

(a) *General.* The brigade BICC is the center for expediting the flow of information among the brigade, its maneuver battalions and direct support artillery battalion, and the division. Relationship with all elements in the system must be established so that the brigade BICC can perform effectively.

(b) *Relationship with division BICC.* The brigade BICC is responsive to orders and requests for information from the division G2 and the BICC. The brigade collection requirements are coordinated by the division BICC and integrated into the division-wide collection effort. To accomplish its data-handling responsibility, the brigade BICC must transmit expeditiously to the division BICC all combat intelligence and information.

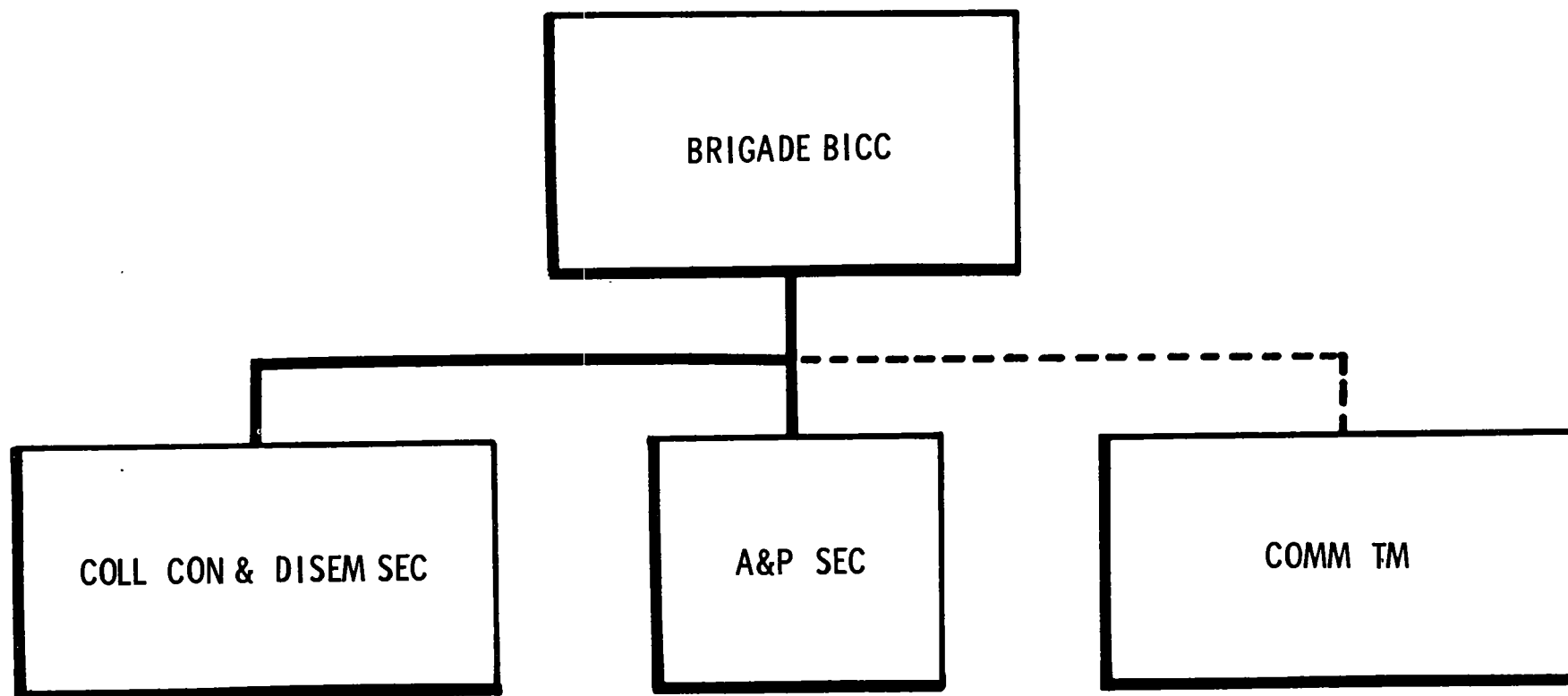


Figure 6-3. Brigade BICC.

(c) *Relationship with other brigade BICC.* The brigade BICC normally coordinates with adjacent brigade BICC. The brigade BICC is responsible for passing to the adjacent brigade BICC all information of interest to them. The brigade BICC coordinates with the adjacent brigade BICC when overlaps or gaps in coverage are discovered. Any corrective measures and changes in task assignment are subject to approval by the division BICC.

(d) *Relationship with maneuver battalion BICC.* The brigade BICC is responsive to requests and missions of higher and lower echelon BICC provided the requests do not interfere with the mission of the supported unit. The brigade BICC is the net control station of the brigade BICC intelligence net used to communicate with the maneuver battalion BICC. The maneuver battalion intelligence collection requirements and STANO plan are coordinated with the brigade S2/BICC and are integrated into the brigade combat intelligence collection effort. The brigade BICC transmits to the maneuver battalion BICC information of interest to the maneuver battalion. Requests for information from the maneuver battalion BICC are fulfilled by the brigade BICC or forwarded to division for collection. Collection requirements from the division BICC which can be accomplished at the maneuver battalion BICC are levied on it by the brigade BICC.

(e) *Relationship with DS artillery battalion BIC.* The DS artillery BIC is responsive to requests for information received from the brigade BICC. Target information acquired by the brigade BICC is transmitted to the fire direction center through the DS artillery BIC.

(f) *Relationship with armored cavalry squadron BIC.* The brigade BICC coordinates with the armored cavalry squadron BIC. When the armored cavalry squadron operates in or adjacent to the brigade's areas of interest, direct contact between the two centers is established for coordination of the collection effort and for the transmission of intelligence data. If division orders the attachment of the armored cavalry squadron to the brigade for a specific mission, the armored cavalry squadron BIC becomes subordinate to the brigade BICC.

(g) *Relationship with brigade S2.* The brigade BICC operates under the staff supervision and operational control of the brigade S2 and is located adjacent to the brigade command post. This arrangement facilitates continuous coordination between the brigade BICC and the S2, and

each is alert to the information needs of the commander.

(h) *Relationship with specialized collection means.* Information of interest to the brigade commander is collected by elements attached or assigned to the brigade, in support of the brigade, or provided by the division. Most of the information acquired by these sources is processed through the brigade BICC. In addition, the brigade BICC assists the brigade S2 with the management of the brigade's overall collection effort in accordance with the tasks established by the brigade S2.

1. *Organic specialized collection means.* There is no organic collection means directly available to the brigade BICC.

2. *Nonorganic specialized collection means.* All requests for specialized reconnaissance and surveillance, e.g., aerial surveillance and additional unattended ground sensor support, and other intelligence support from sources higher than brigade are passed to the division BICC. If the mission request is approved by division G2, the specialized collection means are provided either from resources under division control or requests are forwarded to higher echelons or other Services for approval and fulfillment by resources under their control. The brigade BICC link with nonorganic specialized collection means at the brigade level is through either the brigade S2 or the DS artillery battalion BIC. In coordination with the S2 and S3 of the brigade, the brigade BICC can request any special units assigned to the brigade to perform reconnaissance and surveillance missions. The DS artillery battalion has a target acquisition capability which can also be tasked on a request basis by brigade BICC. The maneuver battalion BICC and the maneuver battalion S2 coordinate the specialized collection means available at maneuver battalion. The battalion S2 also coordinates the tasks with the battalion S3.

c. *Maneuver Battalion BICC.*

(1) *Mission.* The mission of the maneuver battalion BICC is the collection, production, and dissemination of intelligence information in order to produce timely and valid combat intelligence for use as a basis for command decisions.

(2) *Functions.* The maneuver battalion BICC is responsible for expediting the flow of intelligence information and orders/requests for information between the maneuver battalion and the brigade. At maneuver battalion level, the BICC operations assist the battalion S2 in the production of intelligence. This assistance can be divided

into the functional areas of collection, processing, reporting, and dissemination.

(3) *Organization.* The maneuver battalion BICC is an organic element of the direct support company of the MI battalion (combat) division. A maneuver battalion is continually supported by the same BICC.

(4) *Operations.*

(a) *General.* The maneuver battalion BICC is organized to operate within the maneuver battalion command post and is designed to complement the intelligence capability of the battalion headquarters. Its two basic responsibilities are to assist in the management of the collection effort within the entire maneuver battalion area and to expedite the flow of combat information between maneuver battalion and brigade. The battalion BICC is a vital link in the total BICC/BIC system. The maneuver battalion is the lowest echelon tactical unit supported by a BICC. This BICC is, therefore, in a position to influence the force collection effort. Normally, it is the first element to receive frontline information about the enemy and is the focal point for expediting the flow of that information. The maneuver battalion BICC operates under the staff supervision and operational control of the maneuver battalion S2 and responds to the intelligence needs of the maneuver battalion commander.

(b) *Collection, control, and dissemination.* The maneuver battalion BICC, under the staff supervision of the S2, coordinates the combat intelligence collection effort and expedites the receiving, screening, processing, and dissemination of intelligence information for the unit it supports. In conjunction with the S2, it plans and supervises the collection effort, initiates collection orders and requests, tasks supporting collection agencies, recommends collection tasks of supported battalion agencies to the S2, and insures expeditious response to orders and requests. The maneuver battalion BICC maintains an availability status of all intelligence information collected by the units organic to or in support of the battalion. It maintains a record display of the tasks currently assigned to its means and the status of their tasks. It receives all incoming intelligence information and disseminates all outgoing combat intelligence information.

(5) *Relationships.*

(a) *Relationship with other BICC.*

1. *Relationship with the brigade BICC.* The battalion BICC is part of the brigade BICC intelligence net and is immediately responsive to

collection tasks assigned by the brigade S2/BICC. The battalion area collection plan and STANO plan are submitted to the brigade BICC for coordination by the brigade S2 and subsequent integration into the command-wide intelligence collection effort. The maneuver battalion BICC is constantly aware of the requirement to promptly transmit all pertinent information to the brigade BICC. The maneuver battalion BICC is in direct support of its maneuver battalion and is under the staff supervision and operational control of the maneuver battalion S2. The brigade BICC initially tasks the battalion BICC by issuing collection orders for the operation directed to the maneuver battalions by the brigade. As operations progress, the brigade BICC, acting as the collection management element of the brigade S2, continues to task the maneuver battalion BICC. If the MI battalion's (combat) combat surveillance company's radar and sensor monitor teams supporting the maneuver battalion cannot collect the required information, the maneuver battalion BICC tasks other collection means organic to the maneuver battalion. The primary effort of the maneuver battalion BICC is to support the mission of the maneuver battalion. If the brigade BICC levies a collection task on the maneuver battalion BICC which requires the use of the latter's collection means already supporting the maneuver battalion, the battalion BICC informs the brigade BICC that it cannot accomplish the mission. Similarly, it notifies the brigade BICC when a collection task could jeopardize the maneuver battalion mission.

2. *Relationships with other maneuver battalion BICC.* The battalion BICC passes all information of interest to adjacent BICC. This lateral coordination is accomplished through the brigade BICC intelligence net. Control of measures taken to resolve overlaps or gaps in reconnaissance and surveillance coverage between battalions is the responsibility of the brigade S2/BICC.

(b) *Relationships with the maneuver battalion S2.* The battalion BICC is in direct support of the maneuver battalion and under the staff supervision and operational control of the maneuver battalion S2. The battalion BICC usually is collocated with the battalion S2. The battalion S2 places information requirements on the battalion BICC and insures that the battalion BICC satisfies the battalion commander's information needs.

(c) *Relationship with BIC.* The maneuver battalion BICC normally has no direct relationship with the BIC.

(d) *Relationship with specialized collection means.* The battalion BICC, under the direction of the S2, manages the collection effort of the MI battalion (combat) BICC radar and sensor monitor teams and acts as the coordinator and expediter of intelligence information between the battalion and the brigade. The BICC receives requests for information from the brigade BICC and passes them to the battalion S2 for necessary coordination.

d. Division Field Artillery BIC.

(1) *Mission.* The mission of the division field artillery (hereafter in this section named division artillery) BIC is the timely transmittal of combat information and intelligence between the division BICC and division artillery.

(2) *Functions.* The division artillery BIC is primarily an information handling and dissemination center, and functions under the staff supervision and operational control of the S2 in direct support role. It expedites the flow of information between division artillery and division headquarters. It is not a control center and is not a manager of the collection effort. The division artillery S2 is responsible for the combat intelligence functions associated with the division artillery. Division artillery BIC intelligence support involves the three functions of receiving, screening, and disseminating. The division artillery BIC also receives information from the division artillery concerning unattended ground sensors being employed by the division artillery.

(3) *Organization.* The division artillery BIC is an organic element of the direct support company of the MI battalion (combat), division. The BIC consists of a data processing and a communications team. It is placed in direct support of division artillery.

(4) *Operations.* The division artillery BIC is organized to operate adjacent to the division artillery S2/S3 operations center. The BIC is designed to complement the intelligence capability of the division artillery headquarters without affecting the latter's mission, staff relationships, or routine internal operational procedures. The division artillery BIC maintains constant coordination with, and is completely responsive to, the information needs of the division artillery S2 to which it provides support.

(5) *Relationships.*

(a) *General.* The division artillery BIC is the focal point for expediting the flow of intelligence information between the artillery and the division BICC. Relationship with all elements in

the intelligence and artillery system must be established so that the division artillery BIC can perform effectively.

(b) *Relationships with BICC and other BIC.*

1. *Relationship with division BICC.* The division artillery BIC is responsive to information requests from the division BICC. The division artillery collection plan is coordinated and integrated into the command-wide collection effort by the division BICC. The division artillery BIC expedites the exchange of all pertinent combat intelligence and target acquisition information with the division BICC and is under the staff supervision and operational control of the division artillery S2.

2. *Relationships with other BIC.* The division artillery BIC has no direct relationship with other BIC. The BIC of the DS artillery battalions normally reports to the BICC of the brigade or other unit which the firing battalion is supporting. The armored cavalry squadron BIC normally works directly with the division BICC and has no direct relationship with the division artillery BIC, although they are both in the division BICC RATT net.

(c) *Relationship with division artillery S2.* The division artillery BIC is under the staff supervision of the division artillery S2 and operates at the division artillery S2/S3 operations facility. Usually, the BIC personnel and the S2 personnel are collocated and each is alert to the information needs of the other. This arrangement facilitates continuous coordination, and information is exchanged as required. The division artillery BIC supports and assists the division artillery S2 by promptly disseminating combat intelligence information received through the BICC/BIC system directly to the division artillery S2. It also screens and processes combat intelligence information collected by the division artillery and disseminates it to the division BICC. It transmits division artillery target acquisition plans, including capabilities, charts, and overlays, to division BICC for coordination and integration into the division collection effort.

(d) *Relationships with specialized collection means.* The division artillery BIC is an intelligence coordinator and expediter between the division BICC and the division artillery. The division artillery BIC receives and passes information requests from the division BICC to the artillery. The BIC coordinates the artillery collection means. Collection of information by artillery spe-

cialized collection means is accomplished in coordination with division artillery S2 and in conjunction with the primary mission of the division artillery. The information is collected and passed through the division artillery BIC to the division BICC.

e. Direct Support Artillery Battalion BIC.

(1) *Mission.* The mission of the direct support artillery battalion BIC (DS artillery BIC) is to provide the timely exchange of combat intelligence and information between the DS artillery battalion and the brigade BICC.

(2) *Functions.* The functions of the DS artillery BIC are the same as those of the division artillery BIC.

(3) *Organization.* The DS artillery BIC is an organic element of the direct support company of the MI battalion (combat) consisting of a data processing team. This BIC operates from a M-577 carrier command post which contains all the equipment necessary for BIC support of the DS artillery battalion.

(4) *Operations.* The prime responsibility of the DS artillery BIC is the timely transmittal of target information and combat intelligence information. It is a link between the BICC/BIC system and the DS artillery battalion. It has no control over the collection of information, but is the focal point for expediting the flow of information and requests for information between the DS artillery battalion and the brigade which it supports. The detailed operational procedures and individual duties of the DS artillery BIC personnel are the same as those of the BIC personnel at division artillery.

(5) *Relationships.*

(a) *General.* A close relationship with all elements in the intelligence and artillery system is necessary for the DS artillery BIC to perform effectively.

(b) *Relationships with BICC and other BIC.*

1. *Relationships with BICC.* The OIC of the brigade BICC is responsible for the efficient operation and performance of, and is in continuous contact with, the DS artillery BIC. The DS artillery BIC responds to requests for information from the brigade BICC. The DS artillery target acquisition plan is furnished to the brigade BICC for integration into the brigade collection effort. The DS artillery BIC expedites the transmission of all pertinent combat intelligence and target acquisition information to the brigade BICC.

When the DS artillery battalion is in a support role other than that of direct support to its brigade, the DS artillery BIC has the same relationship with the BICC of the headquarters supported by the DS artillery that it had with the brigade BICC.

2. *Relationships with other BIC.* The DS artillery BIC normally will not have a direct relationship with other BIC.

(c) *Relationships with DS artillery battalion S2.* The DS artillery BIC is under the staff supervision and operational control of the DS artillery S2 and operates within or adjacent to the S2/S3 operations facility. With this continuous coordination, each element is alert to the information needs of the other, and information is exchanged as required. The DS artillery BIC supports the DS artillery S2 by promptly disseminating combat intelligence information from the ICC/BIC system directly to the DS artillery FDC or the DS artillery S2. It also screens and processes combat intelligence information collected by the DS artillery and disseminates it to the brigade BICC. It furnishes the DS artillery's target acquisition plans to the brigade BICC for coordination and integration into the brigade-wide collection plan.

(d) *Relationships with specialized collection means.* The DS artillery BIC is not a manager of the collection effort, but is an expeditor between the brigade BICC and the DS artillery. The BIC passes requests for information from the brigade BICC to the artillery. The BIC coordinates the activities of the DS artillery collection means, but is a coordinator only. Collection of information by artillery specialized means is accomplished in coordination with the DS artillery S2 and in conjunction with the primary mission of the DS artillery. The information is collected and passed through the DS artillery BIC to the brigade BICC.

f. Armored Cavalry Squadron BIC.

(1) *Mission.* The mission of the armored cavalry squadron BIC is to expedite the exchange of combat intelligence information between the division BICC and the armored cavalry squadron.

(2) *Functions.* The armored cavalry squadron BIC is an information-handling and dissemination center responsible for expediting the flow of intelligence information and orders and requests for information between the division BICC and the squadron. It is not a control center or manager in the collection effort. The squadron S2 is responsible for the combat intelligence func-

tions of the armored cavalry squadron. The squadron BIC intelligence support effort involves the functions of receiving, screening, and disseminating.

(3) *Organization.* The squadron BIC is organic to the direct support company of the division MI battalion (combat) and consists of a data processing team with an attached communications team. The communications teams attached from the headquarters and headquarters company of the division MI battalion (combat) operate a radio teletypewriter set and a teletypewriter terminal set adjacent to the BICC. They are under the operational control of the squadron BIC OIC.

(4) *Operations.* The squadron BIC operates with the S2 section in the squadron command post to support and complement the intelligence collection and production capability of the squadron. The BIC maintains constant coordination with, and is completely responsive to, the information needs of the S2 staff. When the squadron employs unattended ground sensors (UGS), the squadron monitoring capability should be adjacent to S2/BIC operations. This facilitates coordination, evaluation, and dissemination of the unattended ground sensor (UGS) information and supervision by the squadron S2.

(5) *Relationships.*

(a) *General.* The BIC is the focal point for expediting the flow of information between the squadron and division. Relationships with all elements in the intelligence and squadron system are established so the BIC can perform effectively.

(b) *Relationships with BICC and other BIC.* The squadron BIC coordinates with the division BICC, is responsive to its requests for information, and is in direct communication with it. The squadron collection plan is coordinated by the division G2/BICC and integrated into the command-wide collection effort. The BIC promptly transmits all pertinent combat intelligence and target acquisition information to the division BICC.

(c) *Relationship with squadron S2.* The BIC is under the staff supervision and operational control of the squadron S2 and operates as directed by the S2. Through continuous coordination, and with each element alert to the information needs of the other, information is exchanged as required. The BIC promptly disseminates combat intelligence information from the BICC/BIC system directly to the squadron S2. It also screens, processes, and disseminates combat intelligence information collected by the squadron to the division BICC. It transmits squadron plans—including capabilities, charts, and overlays—to division BICC for coordination and integration into the division collection plan and for use in the direction of the collection effort.

(d) *Relationships with specialized collection means.* The squadron BIC is a coordinator and expeditor between the division BICC and the squadron. The BIC receives requests for information from the division BICC and passes them to the S2. The BIC does not control how this information is acquired but acts as coordinator only.

Section VI. BICC/BIC RELATIONSHIPS

6-14. General

Brigade BICC, maneuver battalion BICC, field artillery BIC, DS artillery battalion BIC, and armored cavalry squadron BIC have similar related and coordinating relationships. This section describes the similar types of relationships common to each other.

6-15. Relationship With Military Intelligence Battalion (Combat)

The BICC/BIC have no operational or mission type relationships with the military intelligence battalion (combat). Matters pertaining to operations and mission are restricted to BICC/BIC channels. The commanding officer of the MI battalion (combat), through the MI battalion (combat) chain of command, retains administra-

tive responsibility over the BICC/BIC personnel. He carries out his administrative responsibility during visits and inspections and by using available administrative communications to process administrative traffic.

6-16. Relationships With All Other Staff Elements

While the BICC/BIC are under the staff supervision and operational control of their respective S2, the BICC/BIC are expected to assist all of their respective staffs to acquire information. Requirements from other staff members are channeled through the S2.

6-17. Relationships for Logistical Support

Though the military intelligence battalion

(combat) is responsible for administration and logistical support of all its subordinate BICC and BIC, distance across the division front make it impossible for the MI battalion (combat) to fulfill

its total support function. Therefore, the BICC/BIC must relay on their supported units for logistic support.

Section VII. THE BICC/BIC/COMMUNICATIONS NETWORK

6-18. General

a. System Requirements. The successful operation of the BICC/BIC system depends on having a communications network with the following characteristics:

(1) High capacity—to handle the large volume of intelligence traffic which each BICC/BIC must pass to higher, lower, and adjacent BICC/BIC.

(2) Speed—to insure that intelligence has not decayed by the time it is disseminated.

(3) Security—to protect the sensitivity of the traffic.

(4) Reliability—to include reliability of alternate means.

b. Means Available.

(1) *At the division BICC.* The primary communications means from the division BICC to BICC/BIC at the brigades, armored cavalry squadron, and division artillery are the teletypewriter sole user circuits provided by the division signal battalion. An alternate means is the division BICC FM-voice radio net to the brigades. The back-up means are three RATT teams, one each at division BICC, artillery BIC, and armored cavalry squadron BIC. See paragraph 6-13a(3)(f) for additional information.

(2) *At the brigade BICC.* The brigade BICC has an FM-voice radio net which provides communications to the maneuver battalion BICC, the direct support artillery battalion BIC, and counterintelligence team operating in the brigade's area.

(3) *Common-user telephone facilities.* Each BICC/BIC has at least one local telephone circuit to provide common-user telephone service through the switchboard of the tactical unit it supports.

(4) *Messenger.* Messenger service is used by the BICC/BIC system to handle maps, overlays, photographs, lengthy reports, and low priority message traffic.

(5) *Sole-user telephone facilities.* Each BIC is provided sole user telephone circuits through their units' switchboard, if facilities are available.

(6) *ASA support company.* The ASA support

company operates secure teletype terminal equipment for the electronic warfare element (EWE) of the DTOC and the SIGINT support element (SSE) of the division BICC. The normal circuit requirements are one full-duplex circuit for the EWE and two half-duplex sole user circuits for the SSE. The EWE terminal and one of the two terminals in the SSE operate as outstations in the ASA support company net. The remaining terminal in the SSE operates as an outstation in the ASA operations net to provide a direct patch to the ASA control and processing company. Both the EWE and the SSE are provided necessary equipment for secure back-up communications. The ASA support company net control maintains communications interface with nets operated for other elements of the cryptologic or SIGINT community as well as patch-throughs required for servicing the SSE of the division BICC.

6-19. Military Intelligence Battalion (Combat) Internal Communications

a. The battalion FM command net includes the battalion commander, the communications officer (the communications platoon leader), and the commanding officers of the headquarters and headquarters company, combat surveillance company, and direct support companies. The battalion commander also operates a station in the division commander's FM-voice net.

b. The battalion wire system includes a switchboard and local telephone circuits for the battalion commander, the two company commanders, and others as required.

6-20. Brigade BICC Communications

The data-handling characteristics of the BICC/BIC system generate the requirement for rapid, reliable, flexible, and survivable communications networks and equipment. The communications means available to the brigade BICC include—

a. Teletypewriter. The BICC terminates the teletype circuit from the division BICC with a teletypewriter central office (AN/MGC-17) provided and operated by the communications platoon, of

headquarters and headquarters company of the MI battalion (combat).

b. Telephone. The BICC has three TA-312/PT telephones which provide common user service through the brigade switchboard.

c. FM Radio Communications Using Radio Set, AN/VRC-47. The brigade BICC has FM-voice radio communications to the division BICC, maneuver battalion BICC, the direct support artillery BIC, and the CI teams operating in the brigade area (fig 8-4).

d. Division Messenger System. The brigade BICC also relies on the division messenger service provided by the division signal battalion for transmission and receipt of bulky reports and other low-priority material.

6-21. Battalion BICC Communications

a. The battalion BICC operates a radio station in the brigade BICC FM net.

b. The battalion BICC FM net also provides voice radio communications to the supporting sensor teams.

c. The battalion BICC has a telephone for common-user service through the battalion switchboard.

6-22. Division Artillery BIC Communications

The communications means available to the division artillery BIC are—

a. Teletypewriter. The division artillery BIC terminates a sole user teletypewriter circuit from the division BICC with a teletypewriter control office provided by the communications platoon of the headquarters and headquarters company, MI battalion (combat).

b. RATT Facility.

(1) The alternate communications means is the RATT net. It is a secure radio teletypewriter net linking the division artillery BIC and the armored cavalry squadron BIC with the division BICC.

(2) Personnel to man a radio set which is provided the division artillery BIC are organic to

the communications platoon of the headquarters and headquarters company, MI battalion (combat) and are attached to the division artillery BIC they support.

(3) *Division area communications.* A third means is the telephone service that is provided by the division area communications system. The division artillery BIC is connected to the division artillery switchboard which has access to the division area communications system.

(4) *Division messenger service.* The division artillery BIC relies on the division messenger service which is provided by the division signal battalion to send and receive bulky and low-priority material.

(5) *Artillery channels.* The division artillery BIC normally receives information from the DS artillery BIC via the division BICC communications means. However, it may receive information from the DS artillery BIC over organic artillery means. The BIC will use the organic artillery communications means only at the discretion and under the direction of the artillery S2.

6-23. Armored Cavalry Squadron BIC Communications

The communications means available to the squadron BIC are—

a. RATT Facilities.

(1) A RATT net is provided among the division artillery BIC, the squadron BIC, and the division BICC.

(2) A vehicular-mounted radio and personnel to man it from the communications platoon of the headquarters and headquarters company, MI battalion (combat) are attached to the squadron BIC.

b. Teletypewriter. A teletypewriter terminal set is utilized as the alternate means of communications to higher headquarters. The teletypewriter terminal and communications personnel to install and operate the terminal are provided by the headquarters and headquarters company of the military intelligence battalion (combat).

c. Division Messenger Service. The squadron BIC uses the division messenger service of the division signal battalion for transmission and receipt of bulky and low-priority material.

Section VIII. STANO PLANNING, COLLECTION, PROCESSING AND DISSEMINATION

6-24. STANO Information Collection

The employment of STANO devices adds intelligence collection assets to the combat elements of

the division. As collection assets increase, the management of intelligence collection becomes more complex. STANO assets must be effectively

integrated into ground and air surveillance and reconnaissance plans so that the capabilities of each asset is maximized and the limitations minimized. STANO assets are employed to complement each other as well as other intelligence collection means, such as HUMINT and SIGINT. For example, ground surveillance radars are positioned to help confirm and more clearly define information collected by unattended ground sensors. Night observation devices can help confirm information revealed by aerial photography, and ground surveillance radars. Information obtained from prisoners of war can be confirmed by timely employment of STANO devices. STANO assets are integrated into the ground and air surveillance plans to provide more complete technical coverage of the battlefield.

6-25. Planning

a. Steps in Planning the Collection Effort.

(1) Determine the intelligence required for decisions and plans.

(2) Determine the priority of need for each of the intelligence requirements.

(3) Determine those enemy activities or characteristics of the area of operations which would indicate the answer to the intelligence requirement.

(4) Determine specific items of information, the presence or absence of which would affirm or refute pertinent indications.

(5) Select and task appropriate agencies to collect the required information. Where additional STANO resources are required, prompt allocations are directed.

b. Intelligence Sources. Consideration must be given to the value of input data, its validity, timeliness, and usefulness. Listed below are some of the intelligence sources, to include human intelligence, which should be used or considered:

- (1) Aerial observers.
- (2) Patrols.
- (3) Captured documents.
- (4) Spot reports.
- (5) Ground photography.
- (6) Intelligence summaries.
- (7) Unattended ground sensors.
- (8) SIGINT/ESM.
- (9) Weather reports.
- (10) Prisoners of war.
- (11) Aerial photography.

- (12) Captured materiel.
- (13) OV-1 Infrared.
- (14) Friendly civilians.
- (15) Technical intelligence.
- (16) Allied units.
- (17) Periodic intelligence reports.
- (18) OV-1 SLAR.

Note. This list of intelligence sources can be used to assist in the collection aspects of management. This list is not construed to be all-inclusive, but is presented to show where some of the most effective intelligence source data useful to the commander can be obtained.

c. The Collection Plan.

(1) The collection plan is a means whereby an intelligence officer uses the intelligence requirements announced by the commander and, by following a logical, orderly process, analyzes the intelligence requirements for indications and translates the indications into specific missions or requests directed to collection agencies. Designation of the time and place to report the information is included. The information is supplemented, as required, by workbooks and other plans such as air and ground reconnaissance plans and observation plans.

(2) The collection plan assists the intelligence officer in the coordination and integration of the collection efforts of the collecting agencies and in keeping all elements of the intelligence section informed of collection activities directed by the headquarters.

(3) The collection plan covers an entire operation. Since the collection effort involves continuous planning, an entirely new collection plan is seldom prepared except when a unit first enters combat. The collection plan is continually revised as required. In effect, it is a slate on which new entries are written as necessary and obsolete entries are removed.

(4) Because information requirements are more complex at higher command levels, the collection plan is normally more extensive at such levels. At any level, however, collection planning is essentially a mental process and the collection plan—regardless of the format used—is merely a device to aid the intelligence officer. It is not a substitute for thinking, and is maintained only to the extent that it assists the intelligence officer in planning and supervising the collection effort.

d. Collection Plan Format.

(1) The collection plan is not prepared in any prescribed form. It can range from a fragmentary worksheet to a long, detailed plan, or it may be a

mental plan alone. Although an experienced intelligence officer can formulate his collection plan mentally, the planning of the collection effort is facilitated and is less subject to error when a formal, written collection plan is used.

(2) The type and makeup of the collection plan will depend upon the size of the unit, the mission, the situation, and the personalities of the staff officer involved. At brigade and battalion levels, because of time and operational limitations, the collection plan must take the simplest form possible, consistent with operational necessity.

6-26. STANO Information Collection

a. Active supervision of the collection effort by the intelligence officer is necessary to insure the success of the effort. This is particularly true of the collection agencies organic or attached to brigade and lower units. Supervision can best be achieved by personal staff visits by the intelligence officer himself or by members of his staff. For example, an S2 may brief members of a patrol before departure and debrief them, as a group, upon their return.

b. The intelligence officer is faced with the problem of efficiently employing all available collection agencies, including STANO assets, to gather information. The commander requires, on a continuing basis, reliable information on the disposition, strength, composition, and movement of hostile forces as well as information on the area of operations. All means are employed to gain information of the enemy forces in his zone and in other areas which may affect the preparation of plans and the accomplishment of the mission. Failure to properly exploit each source of information may deny important information of hostile dispositions, movements, and operations and prevent the exploitation of enemy peculiarities and weaknesses. Supervision of the collection effort must, therefore, be an integral part of the intelligence officer's responsibilities in the collection of information.

c. Of the four steps of the intelligence cycle (planning, collecting, processing and disseminating) activities are directed primarily toward collecting the information. The job of defining the collection task in terms of information requirements, and apportioning the task to various collection agencies, is accomplished by the battlefield information and control center (BICC) in coordination with the staff intelligence officer. Assignment of collection tasks is based upon an anal-

ysis of the nature of the enemy threat, the mission of the command, and the information collection assets available. Organic STANO assets available within the division are discussed in chapter 5.

6-27. Processing of Information

Processing is the step in the intelligence cycle whereby information becomes intelligence. Processing consists of three operations—

a. Recording—The reduction of information to writing or some other form of graphical representation and the arrangement of this information into groups of related items.

b. Evaluation—The determination of the pertinence, reliability, and accuracy of the information.

c. Interpretation—The determination of the significance of the information in relation to information and intelligence already known, and the drawing of conclusions as to the probable meaning of the evaluated information.

6-28. Processing Procedure

a. Information is processed as received without waiting to collect additional information. The battlefield information control centers (BICC) and battlefield information centers (BIC) assist the S2 by screening incoming data, integrating information from all sources, expediting the processing of data and its transmission to other interested echelons. (See paragraph 6-12 for further information concerning the BICC/BIC.) The intelligence derived from incomplete information may be essential, particularly for nuclear targets or for fast-moving internal defense operations. There is always a time lag between the build-up of a target and the time that the information becomes available. If time permits, a search is directed for additional information to complete, confirm, or refute the intelligence developed from incomplete information.

b. The sequence in processing depends upon the nature and urgency of the information. Usually information is recorded first; however, on urgent items, information may be recorded and evaluated simultaneously, then interpreted. Information needed immediately by higher, lower, or adjacent units is disseminated before it is completely processed. Information not of immediate concern, but of possible present or future value, normally is completely processed before being disseminated.

c. Evaluation and interpretation may be instan-

taneous and may be followed by immediate dissemination, depending on the nature of and need for the intelligence. Under normal circumstances, each step will be separately performed.

6-29. STANO Information Dissemination

a. The employment of STANO assets will result in a greater volume of information and intelligence collected and disseminated. STANO information and intelligence must be disseminated to the user in time to permit formulation of plans and initiation of action under the existing situation before the intelligence picture has changed.

b. Dissemination within a headquarters usually is made by personal contacts, oral reports, briefings, distribution of intelligence estimates, analysis of the area of operations, and written reports.

c. Dissemination to higher, lower, and adjacent units is made by means of reports, summaries and studies, intelligence estimates, analysis of the area of operation, operational plans and orders, and maps via allotted radio, wire, and courier services. However, the primary means of dissemination is the BICC/BIC communication means.

Section IX. ENGINEER SUPPORT

6-30. General

a. Elements of the divisional engineer battalions are placed in direct support or attached to a brigade of the division. This section describes various STANO means used by the engineers when accomplishing their assigned missions.

b. Radars and night vision devices may be used to assist in providing close-in security for the unit or work site by providing early warning of advancing enemy troops and equipment. The engineer element uses night vision aids and modified daylight techniques at night. The separate functions of the engineer element are discussed briefly in the following paragraphs.

6-31. Bridging

a. *General.* STANO devices may be used to complement bridge protective systems either while under construction or following completion. Devices which may be particularly useful in this role include image intensifying devices such as starlight scopes and night observation devices, ground surveillance radars, anti-intrusion alarm sets or detectors as well as seismic, acoustic, and magnetic unattended ground sensors.

b. *Erection of the Class 60 or M4T6 Bridge or Raft.* Erection of the Class 60 or the M4T6 bridge is accomplished using the same techniques used during daylight hours. When combat conditions are favorable, the bridge site may be lighted with visible light. Luminescent lane and bridge limit markers are used to guide vehicle operators making the crossing. When combat conditions dictate that the bridge be erected under cover of darkness, the engineer unit will use night vision aids including searchlights in the infrared mode. The

searchlights, mounted on the combat engineer vehicle (CEV) or on available 1/4-ton trucks, provide a high intensity light source for the erection crew. The infrared light source from a metascope or from night vision goggles is used for close or exacting work in areas where the beam of the searchlight is obscured. Overall control and direction are exercised by the engineer officer in charge on the near bank, who uses the tripod-mounted night observation device for infrared viewing. Heavy equipment such as dozers, cranes, graders, and bridge erection boats are equipped with infrared filters on the headlights, and the operators use driving binoculars.

c. *Erection of the Mobile Assault Bridging (MAB), Bridges or Rafts.* Erection of mobile assault bridging (MAB), bridges or rafts, is accomplished by the same techniques used during daylight hours. Each of the MAB vehicles is equipped with infrared filters on the headlights. The driver and vehicle commander are equipped with electronic binoculars for infrared viewing. During a night river-crossing operation, dozers and operators equipped with night vision devices precede MAB vehicles to the river, clear any obstructions, and prepare required river entrances. The MAB vehicles, upon becoming waterborne, assemble as a raft or bridge. A metascope or night vision goggles are used to aid in the detailed assembly of the MAB units. When used for rafting operations, available 1/4-ton vehicles with infrared searchlights floodlight the loading area to facilitate loading on rafts. The first vehicle to cross is a dozer or CEV which is landed on the far shore for construction of exits from the river. An infrared-equipped 1/4-ton truck may also be used on the far shore to provide a high intensity light source for loading and unloading the MAB rafts.

d. Armor Vehicle Launched Bridge (AVLB). The AVLB is used to span short gaps of 60 feet or less. Designed to be carried on a modified M60 tank chassis, this bridge is launched at night, when required, by flooding the bridge site with the light (visible or infrared) from searchlights carried on accompanying tanks or the CEV. When infrared light is used, the AVLB driver and commander, equipped with electronic binoculars, are able to see the gap to be spanned and launch the bridge.

e. Aluminum Assault Footbridge. Using night vision devices, this footbridge can also be erected at night for crossing by dismounted troops.

6-32. Laying, Clearing, and Breaching of Minefields

During night operations, minefields, or proposed minefields are flooded with high intensity infrared light from the searchlights of accompanying tanks, CEV or 1/4-ton searchlight-equipped vehicles. Using this infrared light source, engineer personnel equipped with electronic binoculars lay, clear, or breach minefields in accordance with established minefield doctrine. Where a high intensity light source is not available, or where stealth is required, engineer or other personnel equipped with electronic binoculars and working in pairs, use the metascope or the electronic binoculars as an infrared light source. (See paragraph 10-25 for employment of STANO devices in conjunction with minefields.)

6-33. Demolitions

a. During night operations, engineer demolition crews equipped with night vision devices prepare and set necessary demolitions to breach obstacles and reduce fortified positions. The CEV, which has both an infrared and demolition capability, is sometimes employed in conjunction with these demolition crews.

b. Atomic demolition munitions specialists prepare ADM sites when required, using night vision devices as surveillance aids. As an additional security measure the ADM teams may also take advantage of the use of unattended ground sensors.

6-34. Combat Construction

a. Horizontal Construction. During night operations, engineer construction vehicles such as cranes, shovels, dozers, graders, and dump trucks equipped with infrared headlights, and operators

equipped with electronic binoculars perform construction tasks essential to an operation. Tasks such as road and airfield construction and other horizontal construction are accomplished at night by engineer crews and equipment using night vision devices.

b. Vertical Construction. Vertical construction tasks such as the construction of observation towers, standing obstacles, barriers, and fortifications are also accomplished at night using either visible light or night vision devices.

6-35. Water Purification

Water purification teams are equipped with night vision devices to permit water purification operations to proceed on a 24-hour basis. During sustained operations, water points are flooded with infrared light to permit tank truck operators equipped with electronic binoculars to load their vehicles.

6-36. Night Vision Equipment for Engineer Vehicles

a. Combat Engineer Vehicle (CEV). The CEV provides engineer units in the forward combat areas a versatile, armor-protected means of performing combat engineer tasks under hostile fire. For night operations, the CEV is equipped with an infrared/visual gunner's, operator's, and commander's periscope; the M18 infrared binocular for the commander; the xenon searchlight, and the electronic binocular for the operator when used in open hatch viewing. Other night vision equipment organic to the CEV is the crew-served weapons sight (image intensifying) for use with the machinegun.

b. Armored Vehicle Launched Bridge (AVLB). The AVLB, discussed in paragraph 6-31, is equipped with the following night vision devices:

- (1) Infrared filters for headlights.
- (2) Electronic binoculars.
- (3) Infrared periscopes.

c. Class 30 Assault Trackway. The class 30 assault trackway is a metallic track carried on a 5-ton bridge truck. The track is used to improve the bearing capacity of short stretches of roads. If used at night, it should be equipped with infrared filters for headlights, and the driver should be equipped with electronic binoculars.

6-37. Control of Night Vision Equipment

Night vision equipment is not available for all

personnel in engineer units. Presently authorized night vision equipment, therefore, should be strictly controlled at engineer company or battalion level and allocated on a daily (nightly) basis to those engineer elements having a mission-es-

sential task during the hours of darkness. When required for mission-essential tasks, night vision equipment not authorized to engineer units is obtained from the division support or other logistical command.

Section X. FIRE SUPPORT

6-38. General

The fundamentals of fire support remain unchanged even with the increased emphasis placed upon the employment of, and the sophistication sometimes attributed to, surveillance, target acquisition, or night observation devices. Such devices assist the combat commander in obtaining information on the enemy for the planning and execution of his assigned mission. In addition, these devices provide the commander with the ability to more accurately locate the enemy and increase the effectiveness of his fire support means.

6-39. Fire Support Coordination

a. The objective of fire support coordination is to provide the most effective fire support possible with the means available, to avoid duplication of effort, and to achieve complete integration of all supporting fires in the scheme of maneuver or plan of defense. The effectiveness with which the commander uses fire support in his plan of action will be a decisive factor in the battle. Fire support coordination is the coordinated planning and initiation of fire support so that targets are adequately attacked by appropriate means.

b. STANO devices assist the commander in optimizing the delivery of fire support by providing more timely and accurate fires and reducing unnecessary duplication of effort.

c. In addition to fire support coordination as outlined in FM 6-20-1, and FM 6-20-2 for field artillery applications, the following considerations apply:

(1) Duplication of STANO devices in detecting enemy locations is essential to the extent that some verification of information may be necessary.

(2) The FSCOORD must be fully aware of all STANO devices available to him; the capabilities and limitations of each device; and the fire support requirements necessary to support the various STANO devices and the mission of the supported unit as a whole.

(3) STANO devices increase the ability to more accurately describe the target to be engaged, and thus assist the FSCOORD in recommending a more effective method of attacking the target.

6-40. Support of the Offense

a. During offensive operations, the field artillery must be organized and deployed to provide supporting fires to the attack, furnish continuous support during the action, and protect the attacking force during reorganization. STANO devices may be employed to assist in insuring the success of offensive operations by providing the capability to—

(1) Monitor a greater area with more intensity and for extended periods of time.

(2) Extend the effective area of coverage beyond present limits.

(3) Detect enemy movements far beyond the FEBA even in adverse weather conditions.

(4) Detect and disrupt enemy movements during periods of darkness.

(5) Deliver more effective harassing and interdiction fires.

b. Fire planning is a continuous function. The increased emphasis placed upon the incorporation of radars, sensors, image intensifiers, etc., into the conduct of the attack require the fire support plans to be capable of supporting the STANO devices employed in the attack. In addition to the considerations necessary to develop a fire plan, the operations personnel at each artillery echelon and the fire support coordinator must—

(1) Be fully aware of the capabilities and limitations of all STANO devices to be employed.

(2) Be capable of rapidly engaging those sightings and/or activations designated by the supported commander as targets.

(3) Insure that when employing radars, sensors, forward observers, etc., unnecessary duplication of effort is avoided.

(4) Know the planning, emplacement and monitoring of unattended ground sensor fields in each of the following categories.

(a) Surveillance—supervised by G2/S2.

(b) Alerting or warning—supervised by maneuver commander.

(c) Target acquisition—supervised by the fire support coordinator (FSCOORD).

c. Fires during the attack are delivered to assist the advance of the supported unit. Successive target fires on confirmed or suspected enemy locations may be prearranged fires in support of accurately emplaced unattended ground sensors. Fires must be planned beyond the final objective (to include likely enemy avenues of approach or withdrawal) to insure that the available fire support means can effectively cover sensor fields, radar sightings, or other STANO activations or sightings.

6-41. Support of the Defense

a. Field artillery must be prepared to support all phases of defensive action. It must be capable of massing fires on critical localities beyond the range of other supporting weapons. Supporting artillery must be prepared to fire in any area by rapidly shifting its direction of fire or by occupying alternate or supplementary positions. It augments the defensive fires of the supported force with final protective fires (FPF), barrages and other prearranged fires.

b. A detailed discussion of artillery fire support in defensive operations may be found in FM 6-20-1. Those applications and considerations of fire support and fire planning discussed in paragraphs 6-38a and 6-38b also apply to defensive operations.

6-42. Retrograde Operations

Retrograde movements are classified as delaying actions, withdrawals, or retirements. Artillery units supporting retrograde operations should be highly mobile. Artillery fires are employed to deceive, disrupt, destroy, and delay the enemy advance, to neutralize enemy artillery, to assist the maneuver elements in disengagement, and to support limited counterattacks and tank sweeps. Details of the maneuver aspects of a retrograde movement are contained in FM 61-100.

6-43. Counterbattery Tactics

Counterbattery tactics is the artillery commander's expression of his plan for employing the artillery to attack hostile weapons in support of the force commander's mission and plan of maneuver or defense. It may include the type of counterbattery program to be executed, methods of attacking specific targets, and the artillery commander's criteria as to what should constitute a confirmed or suspected weapon location.

Section XI. AVIATION STANO SUPPORT

6-44. Introduction

a. *General.* Army aviation resources available for support of combat operations are a valuable asset to commanders at all echelons. The success of an operation employing STANO systems is highly dependent on the manner in which these aviation resources are employed.

b. *Divisional Aviation.* Each infantry and airborne division is authorized an aviation battalion and an air cavalry troop. Each armored and mechanized division is authorized an aviation company and an air cavalry troop. Airmobile divisions are authorized an aviation group, an air cavalry squadron, and an aerial field artillery battalion. In general, the aviation resources available within divisions may be employed in a large variety or roles. Some aircraft, performing surveillance, reconnaissance, and target acquisition, are dedicated to the performance of those types of missions because the STANO equipment which is

installed cannot be easily removed to allow use of the aircraft in other tasks. For most STANO support roles, however, any aircraft can be selected for use, depending on overall divisional requirements for use of the available aircraft.

c. *Nondivisional Aviation.* In some instances, support from corps or field army aviation resources will be required to support STANO activities. Requests for such support will be made by the division staff when urgent requirements exist which cannot be fulfilled by divisional units. The most apparent example of such a requirement is airlift of STANO ground-based equipment which exceeds the load-carrying capacity of divisional aircraft. Such equipment could be—

- (1) Radar equipment.
- (2) Heavy searchlights.
- (3) Radio relay vans.

See chapter 15 for STANO support that can be furnished by the U.S. Air Force.

6-45. Employment

Specific STANO support functions which can be accomplished by army aviation (normally divisional resources) are as follows:

a. Unattended Ground Sensor Activities.

(1) *Aerial emplacement.* Emplacement of unattended ground sensors requires a high level of coordination and advanced planning by all staffs involved. As with hand-emplaced UGS, electromagnetic operating frequencies must be selected and procedures must be established which minimize difficulties experienced by crews in insuring that the correct individual items are emplaced at the designated locations. Selection of the desired locations normally is made by the unit having responsibility for surveillance of the area involved. Initial planning includes determination of whether monitoring of desired locations can be accomplished from existing monitor (readout) stations. This can be accomplished by terrain map profiling techniques. If monitoring is estimated to be marginal, the monitor site or the UGS field must be relocated, or the area disregarded. This may result in a requirement for relay stations or arranging for aerial monitoring. When possible, aerial photos of the target area should be acquired. These are used for selection of exact points of emplacement, for use by crews in approaching and locating the area, and once the sensors have been dropped, to locate their emplacement points. Checkout for operation of the emplaced sensors can be made by overflying the seeded sensor area by aircraft, firing artillery rounds into the general location, and/or using readout devices aboard the aircraft immediately after emplacement of the sensors. Crews must record the exact points of emplacement so that accurate responses to detections can be made.

(2) *Aerial monitoring.* Because aircraft normally are in high demand, aerial monitoring usually will have to be accomplished on a periodic basis. The most likely periods of enemy activity should be emphasized as a criterion for monitoring times by aircraft. When commandable UGS are in use, only short aerial excursions will be required periodically. Crews must be briefed regarding exact locations of the UGS, flight altitudes desired, and the orbit area from which monitoring is desired. The orbit area is especially significant because of the need for deception regarding the fact that monitoring of a particular area is occurring. Radio procedures must be prearranged in order to allow instantaneous reports to

be made by the monitor operator aboard the aircraft.

(3) *Aerial relay.* Basically, the same aircraft availability criteria will govern this activity as were illustrated for monitoring activities. Procedures must be established to insure that flight crews are familiar with peculiarities of the relay equipment, such as antenna orientation requirements. In this case also, altitudes and orbit areas must be established. It is desirable to have means for operational checkout of relay equipment before takeoff and radio voice communications must be established between aircraft and ground terminals.

(4) *Special situations.* Aerial monitoring or relay are extremely useful for operational requirements which result from certain tactical situations. When retrograde operations take place, UGS which were previously monitored from ground sites may become beyond line-of-sight capabilities of the monitor teams. It may be important to continue monitoring activities by aerial means in order to "observe" enemy reactions to the friendly movement. Further, during fast-moving offensive operations, UGS emplaced by other Services may require aerial monitoring by Army aircraft in order to ease the transition of responsibility for those UGS to Army ground monitor teams or to avoid costly delays in acquisition of detection information. Frequent requirements will exist for emplacement of UGS by mortars or field artillery. It may not be possible to monitor these UGS from existing ground stations. Army aviation is ideally suited to assume responsibility for monitoring during such fast-moving situations. In emergency situations, supporting SIGINT and ESM means may be called on to monitor and locate transmissions from unattended ground sensors.

b. Illumination.

(1) Illumination of the battlefield by aviation means can be exploited to its maximum potential only if sufficient planning accompanies its use.

(2) Flares can be employed effectively; however, the use of aircraft to drop flares is extremely costly in terms of depletion of available aviation resources. To drop flares, the aircraft must be directly above the target area, and this places them in a vulnerable position to enemy air defense means. As with artillery flares, careful coordination must be accomplished with ground units regarding planned illumination, and radio communications should be established between the aircraft and supported units. When adequate nav-

igation means are available to the aircraft (including ground-based radar), flares can be effectively dropped from above or within clouds. This technique normally is effective only when height of cloud bases allows the required illumination to be applied.

(3) Airborne searchlight employment is similar to that of flares. The flight crew must be given detailed instructions regarding the target area in order for them to select appropriate beam widths and flight altitudes. It is difficult to accurately locate an aircraft dropping flares; however, since the searchlight is directly attached to the aircraft, it does make the aircraft more vulnerable to enemy fire.

c. Aerial Radiological Survey. This capability is essentially the same as that available through ground means, except that survey requirements can be handled more rapidly than from ground vehicles, thus affording less risk of exposure to monitoring personnel. Large areas can be effectively surveyed, thereby providing commanders and staffs with more immediate information. For detailed information pertaining to aerial radiological surveys see FM 3-12.

d. Coordination of Ground Surveillance Detections with Aviation Response. When ground STANO means reveal enemy activity or suspected activity, aviation elements can be employed to either confirm the detection or engage the target. The detecting equipment can often be used to accurately guide the aircraft or attack team to the target. This is most applicable to radars. When such techniques are used, adequate radio communications must be established. Prearranged missions are required if response is expected to be immediate; otherwise, delays may occur until aircraft become available.

e. Visual. Visual STANO activities by aircraft assigned such missions are normal and routine; however, all aircraft crews constitute a valuable source of information regardless of the nature of

their assigned missions. They continuously monitor the battlefield as they perform other tasks, and they should be instructed regarding action to be taken when enemy activities are observed, e.g., attack, report, and monitor.

f. Emplacement and Extraction. Patrols, artillery forward observers, and UGS emplacement teams can be placed in and withdrawn from remote areas by means of aviation support. Normally, deceptive flight techniques are used by the flight crews by making false landing and performing actual drop and pickup at areas somewhat removed from the target area or point. Such operations require a high degree of coordination and prior planning to insure that the ground missions can be accomplished. Because the ground element may become disoriented in the air, flight crews should provide a last minute briefing regarding desired direction of initial movement and other pertinent instructions.

g. Escort. Armed helicopters normally are available for escort of other aircraft performing STANO missions. Such escort may be required when exceptionally risky missions are attempted or when immediately available reaction capabilities are desired. Fire teams can either directly accompany STANO aircraft or they can be on call from inflight orbit areas.

h. Logistic Support. Army aviation is available to provide airlift of urgently needed repair parts, replacement equipment, or maintenance teams for STANO items, and they can be used to evacuate disabled equipment for repair at remotely located facilities. Such requirements must be coordinated through supply, maintenance, and aviation operations channels.

i. Airborne Personnel Detector Missions. Helicopters carrying airborne personnel detectors and operators, accompanied by armed helicopters may be employed in conducting airborne personnel detector missions.



CHAPTER 7

STANO PRINCIPLES OF EMPLOYMENT

Section I. INTRODUCTION

7-1. General

This chapter outlines the general principles, capabilities, and guidelines that commanders and staff officers at all echelons should consider when employing STANO systems and equipment.

7-2. Planning

a. Early in the planning stage of an operation, commensurate with the preparation of the STANO Annex (chap 9) to the operations order; specific information must be evaluated to insure that the STANO assets will be effectively employed.

b. To assist in the overall combat intelligence function, STANO devices can be used to supplement and complement other information gathering media. Tasking and emplacement of these devices

involves their integration into the total battlefield surveillance and target acquisition planning at all echelons. These assets must be incorporated in the intelligence system to contribute to all other means of gathering information.

c. Effective use of STANO devices must be directly related to both the friendly and enemy tactical situations. Planning for the use of these devices requires an analysis of both the current and predicted situations and other collection capabilities. From this analysis will come recommended areas for STANO materiel emplacement, and determination of equipment requirements. Coordination of the projected STANO materiel employment with similar STANO operations underway in adjacent or supporting units must also be considered during the planning phase. Failure to adequately plan the employment of STANO devices reduces the value to be gained by their use.

Section II. PRINCIPLES OF EMPLOYMENT

7-3. Principles of Employment

The following principles apply to the employment of STANO equipment and systems:

a. Obtain soil composition and ground bearing capacity (use of UGS).

b. Use passive equipment/systems in preference to "active" equipment.

c. Insure duplication and overlap of equipment to increase reliability.

d. Verify acquired targets by using more than one type of sensing technique.

e. Employ equipment at the lowest possible level.

f. Maintain positive control of all STANO equipment/systems.

g. Afford maximum use of STANO assets.

h. Prevent interference between STANO equipment.

i. Minimize the transfer of STANO assets.

j. Consider vulnerabilities of various STANO means.

7-4. Obtain Soil Composition and Ground Bearing Capacity of Terrain Forward of the FEBA

a. A requirement exists for information on the ground bearing capacity of the terrain forward of the FEBA. This requirement stems from the need to preset certain unattended ground sensors in accordance with the density of the earth surrounding them.

b. When required, this information may be obtained by photogrammetry and through photointerpretation. In some instances, this information may be readily available from prepared terrain and trafficability studies, the tactical commander terrain analysis (TACCTA), or other intelligence reports. As this is intelligence data, requests for this information are routed through intelligence channels.

7-5. Passive/Active STANO Systems

a. All STANO equipment may be classified as active or passive depending on whether the equipment emits a detectable signature which can be identified by the enemy. Determination of the classification of a system in a particular situation will depend, to a degree, upon enemy capabilities. For example, an IR searchlight is an active emitter of IR light and can be easily detected by the most simple IR detection device. On the other hand, in a low intensity conflict against a poorly equipped insurgent force, the IR searchlight may, for all practical purposes, be invisible.

b. The signature of most active STANO equipment is unique to that type of equipment, i.e., detection and identification of the equipment by the enemy will, to a certain extent, yield friendly order of battle information. Detection and identification by the enemy also makes the equipment or system susceptible to enemy electronic countermeasures which can at least reduce the system's effectiveness and possibly permit the system to continue operation while feeding it false or misleading information. Normally it is preferable to rely on passive STANO systems which do not indicate their presence and operation on the battlefield.

7-6. Insure Duplication and Overlap of Equipment

a. Many items of STANO equipment when employed with other STANO devices or systems have duplicating or overlapping capabilities. There are many types of STANO and STANO-related equipment available to meet the commander's requirements for enemy information. Each type of equipment has characteristic capabilities and limitations which determine the condition under which it functions most effectively. No single type of STANO equipment can satisfy all of a commander's information needs. Neither can a single type function effectively in all operational and physical environments. For example, the night observation device (NOD) and the light weight radar are both line of sight devices which can detect military targets at ranges out to 1 or 2 kilometers. However, they use different methods to accomplish their purpose (image intensification versus radar), and present their information in a different manner (the radar gives audio and meter outputs and the NOD yields a picture much like on a TV screen). Another example is the starlight scope and the handheld thermal viewer. Both

yield information as "pictures" and operate at generally equivalent ranges; however the starlight scope is an image intensifier and will not work in absolute darkness, while the handheld thermal viewer is a thermal imaging device which detects infrared temperature difference and is not dependent on visible light. The handheld thermal viewer will work in sunlight, the starlight scope will not. It is, therefore, necessary to employ a balanced combination of available means to insure adequate coverage of the battlefield and a high reliability of the collected data. Economy of STANO assets must be maintained when using this principle, in order to avoid excessive employment of any one type of STANO device in meeting this criteria.

b. In addition to having different types of STANO equipment which cover the same area whenever possible, similar items of equipment (NOD, starlight scopes, radars) should have overlapping areas of coverage. Each piece of equipment should be assigned to cover a specific sector, with sector limits indicated by degrees or landmarks.

c. Commanders and staff officers planning the use or allocation of STANO equipment must be aware of these duplicate and overlapping requirements and plan employment/allocation so that, when possible, all echelons will have duplicate/overlapping coverage and not be dependent on any single device or system. If properly coordinated, this will result in more accurate and timely target detection, and perhaps more important, increased probability of positive target detection. It will also partially negate the effects of adverse weather and terrain.

7-7. Verification of Acquired Targets

Where possible, a minimum of two different types of equipment (e.g., radars and UGS, or thermal viewers and night vision devices) should be used to verify the identification of suspected targets. This principle permits the commander to properly analyze his intelligence, giving him a greater assurance of validation of the target by type, size, location, and direction of movement.

7-8. Employ Equipment at the Lowest Possible Level

The principles of war and fundamentals of combat operations require commanders to allocate to subordinate units those assets they need to accomplish their assigned missions. STANO

equipment should be allocated to the lowest level which can effectively use it. Many STANO systems, especially airborne systems, have requirements for relatively elaborate and sophisticated maintenance and support facilities and are consequently assigned organically to higher command echelons (corps, field army); while at the same time these systems are designed to directly support maneuver units (battalion, brigade) in the field. Commanders and staffs at all echelons must be knowledgeable of the capability and availability of STANO equipment at various levels, and must actively seek those assets they require for mission accomplishment.

7-9. Maintain Positive Control of All STANO Systems

Commanders at each echelon using STANO equipment, especially "active" equipment, must establish and maintain responsive, reliable, and complete control over the equipment at their own and lower levels. Some types of STANO equipment are active emitters of electromagnetic radiation. Their particular emissions can be identified by the enemy. Combat operations involving tactical cover and deception will require command control over all electromagnetic emitters (radios, STANO equipment) in the maneuver force. At certain times, STANO "silence," similar to radio silence, must be established. At other times, STANO assets may remain in position in an active mode while the unit moves to another area. Control of active STANO equipment is especially important in the case of low density equipment such as the AN/TPS-25 radar which is assigned on the basis of one per division. Detection of such a low density item would give the enemy important order of battle information.

7-10. Afford Maximum Use of STANO Assets

Maximum effective use of STANO assets will require close and continuous staff coordination. The operation of STANO systems must be monitored to insure that the using organization is making the best possible use of the system in terms of capability and time in operation.

7-11. Prevent Interference Among STANO Equipment

Some STANO equipment interferes with and degrades the performance of other STANO equipment. For example, first generation image intensi-

fication equipment is blanked out by bright visible light such as that from flares or searchlights; certain radars cannot be operated in close proximity to other radars or electronic equipment. Use of radio frequencies must be coordinated. Staff coordination must include a consideration of equipment peculiarities, future tactical operations, and, when necessary, command guidance must establish priorities.

7-12. Minimize the Transfer of STANO Assets

During the conduct of combat operations, it may be necessary to transfer operational control and in some cases move equipment from one unit to another. This will apply particularly to unattended ground sensors. The concept of continuously moving operations will necessitate changes in area of responsibility of the various units. Unattended ground sensors will continue operating for only specified periods of time. New units operating in the area can use the already emplaced sensors only if they are aware of their locations, identity codes, and channels. Transfer of control may involve turnover of relay sites to include personnel and equipment. Transfer of STANO assets is not restricted to UGS but may also include such equipment as radars and observation devices which are deployed in such a manner as to make it impractical to dismantle and move the equipment. In these cases, units exchange like items of equipment in much the same manner that larger units exchange weapons during a relief in place. In those cases where equipment is not available to exchange, personnel may be detached from their parent organizations and temporarily attached to another unit. In all instances, exchange of personnel should be kept to a minimum.

7-13. Consider Vulnerabilities of Various STANO Means

a. Many STANO devices rely on electromagnetic energy for the sensing function, and transmission of sensed data via communication links to the monitoring station. As electromagnetic energy is radiated, the STANO system becomes exposed to the hazard of enemy signal detection, interception analysis, direction finding, and exploitation in the form of electronic countermeasures (jamming and deception). The detailed discussion of jamming and deception contained in FM 31-40 and FM 32-20 is applicable to STANO systems.

b. Countering the threat outlined above requires judicious application of sound signal secu-

FM 31-100 (TEST)

urity (SIGSEC) practices and procedures, especially electronic security (ELSEC), and thorough training in electronic counter-countermeasures (ECCM). SIGSEC reduces the amount and reliability of technical information which the enemy is able to derive from his SIGINT/ESM effort.

ECCM reduce the effectiveness of enemy electronic countermeasures (ECM).

c. The ELSEC and ECCM guidelines provided in FM 32-5 apply to STANO and STANO related systems. FM 32-5 also describes the SIGSEC support which is provided by the USASA.

CHAPTER 8

DIVISION COMMUNICATION NETS

Section I. DIVISION STANO COMMUNICATIONS

8-1. General

STANO-related information flows between subordinate headquarters and division headquarters by means of radio teletypewriter, voice radio, teletypewriter telephone communications, and messenger service. A major portion will flow through the dedicated BICC/BIC communications means. The primary means of communications between the division BICC, the brigade BICC, and the division artillery BIC are the sole-user teletypewriter circuits provided by the division communications system (multichannel radio or land line). The secondary means of communications is secure FM-voice radio. The primary means of communications between the division BICC and the armored cavalry squadron BIC is over the secure radio teletypewriter RATT net provided by the military intelligence battalion (combat). The military intelligence battalion (combat) also provides communications personnel and a teletypewriter terminal for the HHT of the armored cavalry squadron. This teletypewriter terminal is used as an alternate means of communications to higher headquarters. Normally, the terminal is utilized when the HHT collocates near a division forward area signal center (FASC). Teletypewriter circuits are installed by personnel of the FASC. In addition, STANO-related information may be channeled to the division over the division operations/intelligence net radio teletypewriter or other division level RATT and FM-voice radio nets. Telephone circuits, to include the BICC/BIC, are provided for all elements over the division area signal system and may be used to transmit STANO-related information to division. Messenger service provided by the division signal battalion may be used to transmit low-priority and/or bulky items between echelons. Figure 8-1 illustrates a typical division communications network which will support the STANO information flow. Figure 8-4 shows the BICC/BIC communications circuits.

8-2. Brigade STANO Communications

STANO-related information flows between subordinate units and brigade by means of voice radio, radio teletypewriter, telephone communications, and messenger service. A major portion will flow over the BICC/BIC secure FM voice radio nets. Included in this net are the brigade BICC, the maneuver battalion BICC, and the DS artillery battalion BIC. In addition, STANO-related information flows to brigade over the brigade intelligence net (FM), the brigade RATT net, the DS artillery battalion command/fire direction (CF), and fire direction (F) nets, and the Air Force request net single sideband (SSB). The subordinate elements are also linked to the brigade through the internal wire nets. Messenger service for the transmission of low priority and/or bulky items is provided to all units. Figure 8-2 illustrates a typical communications network which supports the flow of STANO information at brigade level. Figure 8-4 shows the BICC/BIC communication network.

8-3. Battalion STANO Communications

STANO-related information normally flows between subordinate units and battalion by voice radio, with an alternate means of internal wire. Companies communicate over the battalion command net (FM); forward observers communicate over the (F) net (FM). Battalion BICC communicate with the Bde BICC using the appropriate FM net. Figure 8-3 illustrates a typical communications network which supports the STANO information at battalion level. Figure 8-4 shows the BICC/BIC communications nets.

8-4. Company/Battery/Troop Communications

The company receives and disseminates STANO information primarily by voice radio. The company operates the FM command net; which operates within the battalion FM command net.

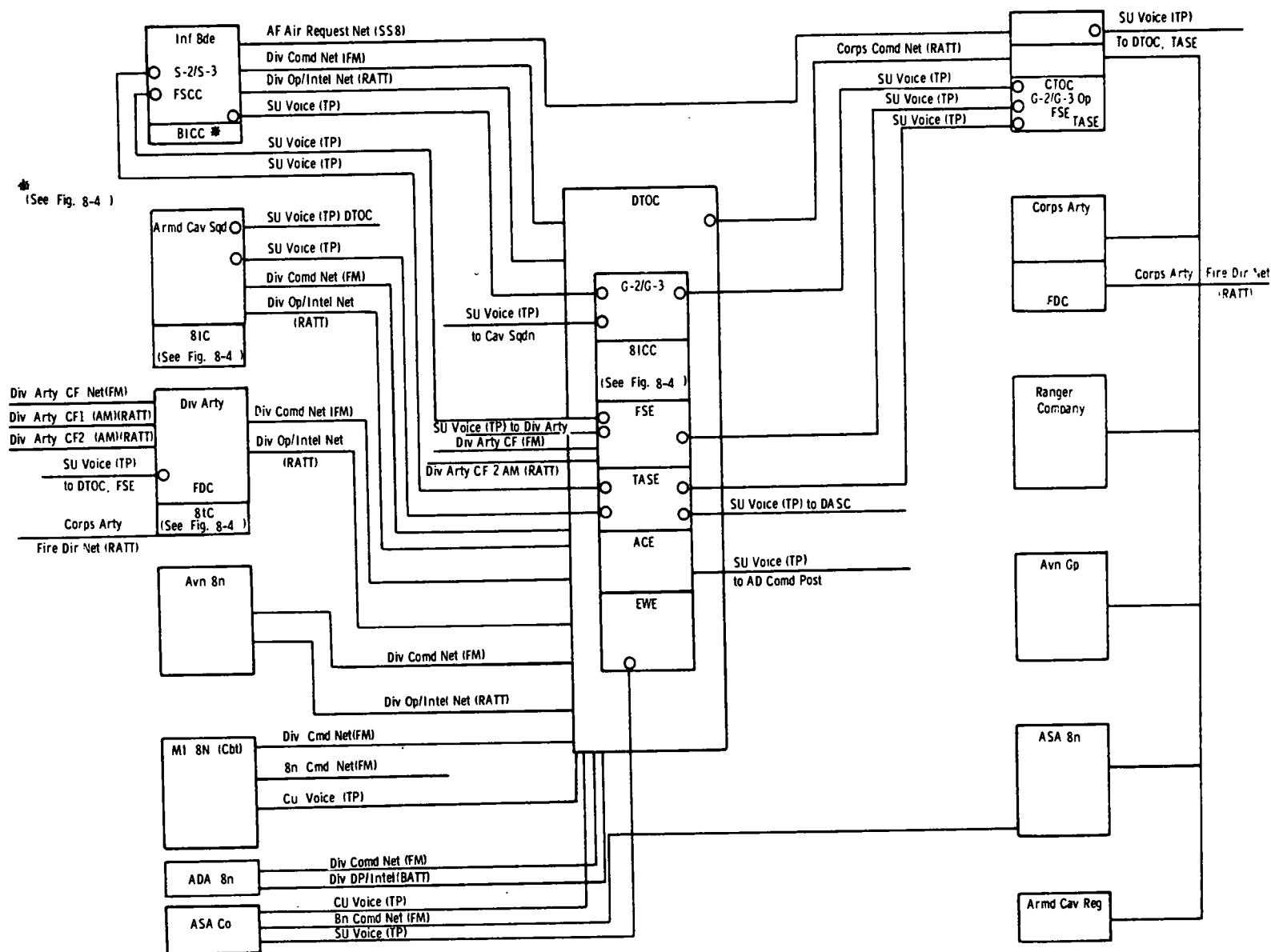


Figure 8-1. Typical division STANO communications network.

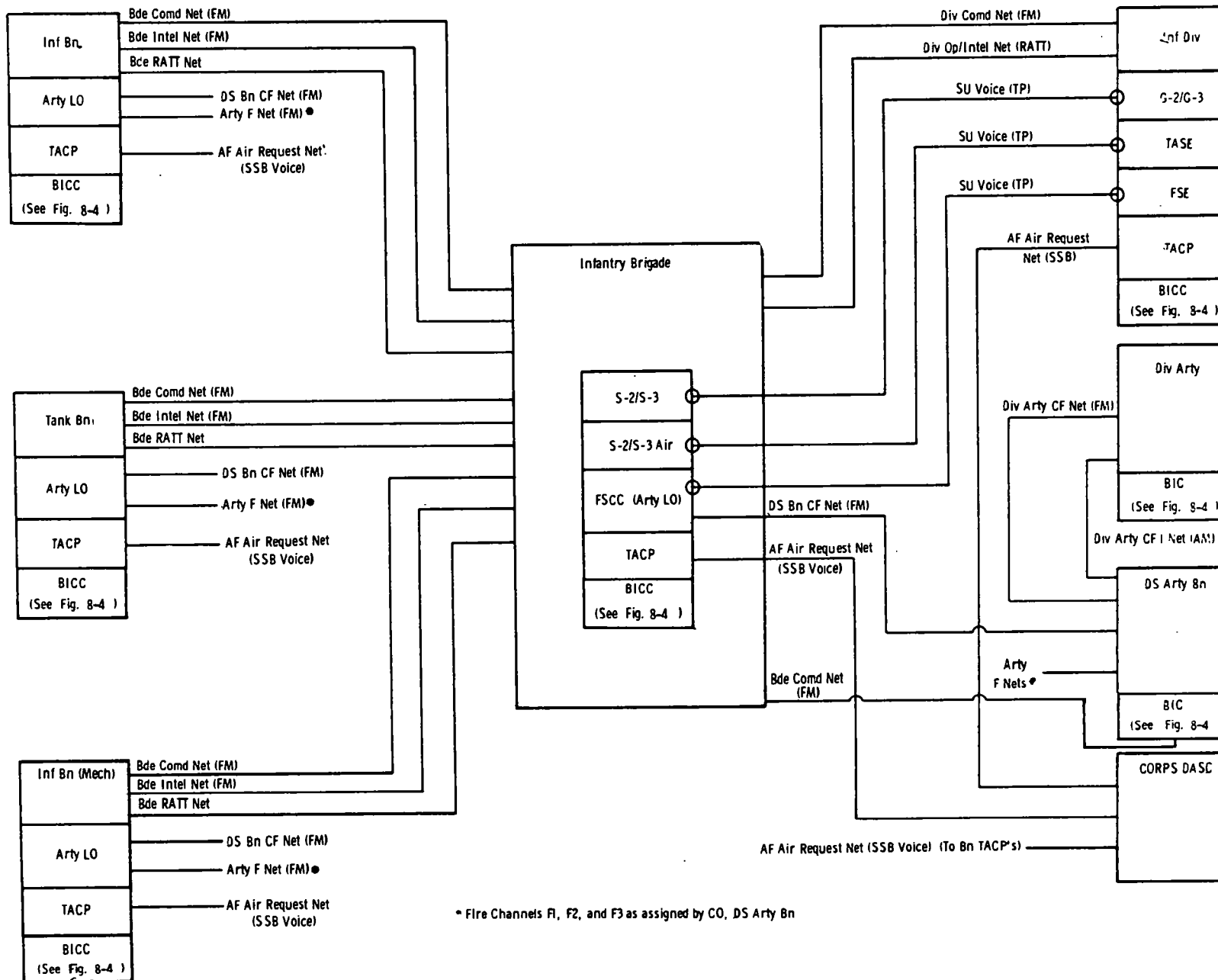


Figure 8-2. Typical existing brigade STANO communications network.

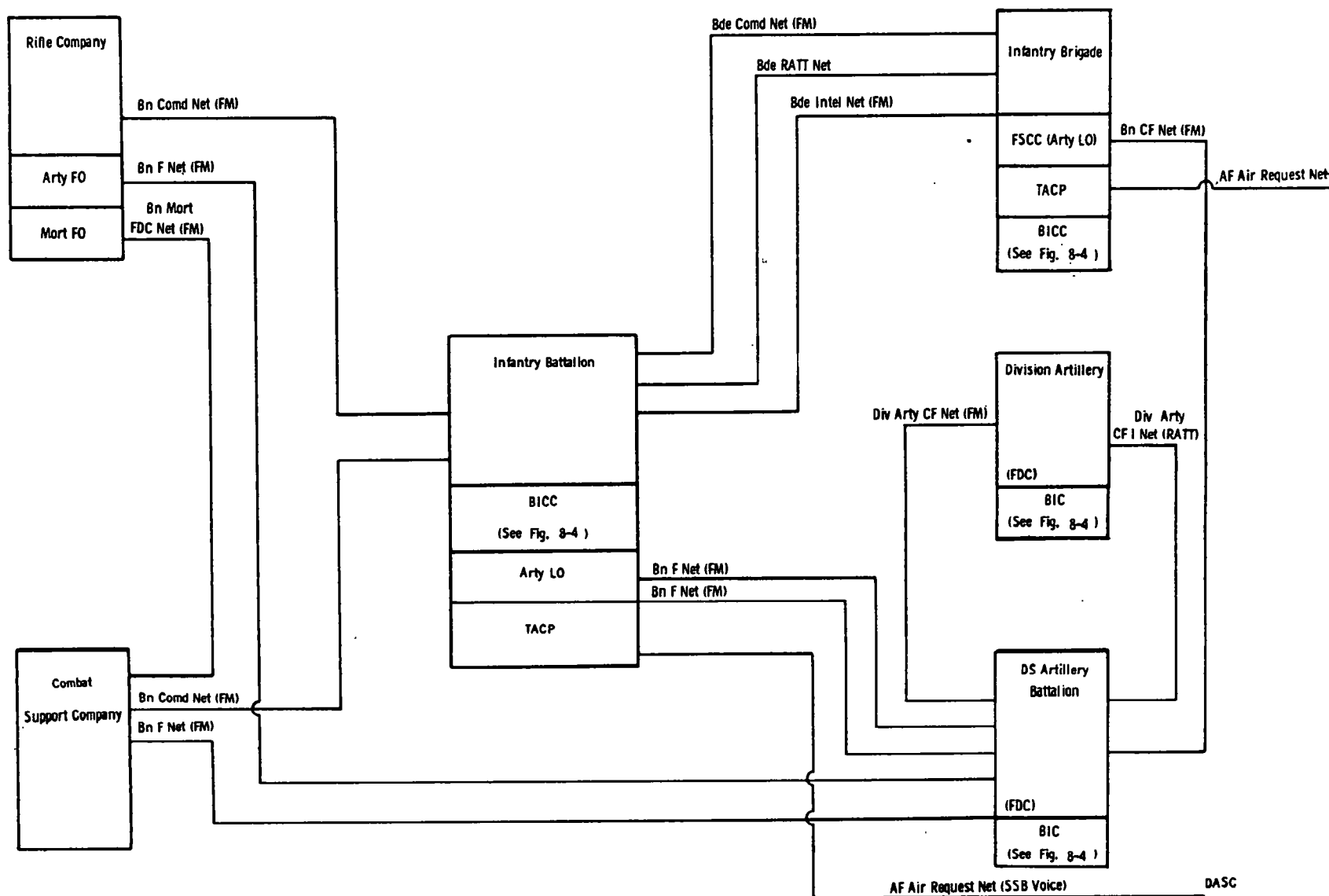


Figure 8-3. Typical existing battalion STANO communications network.

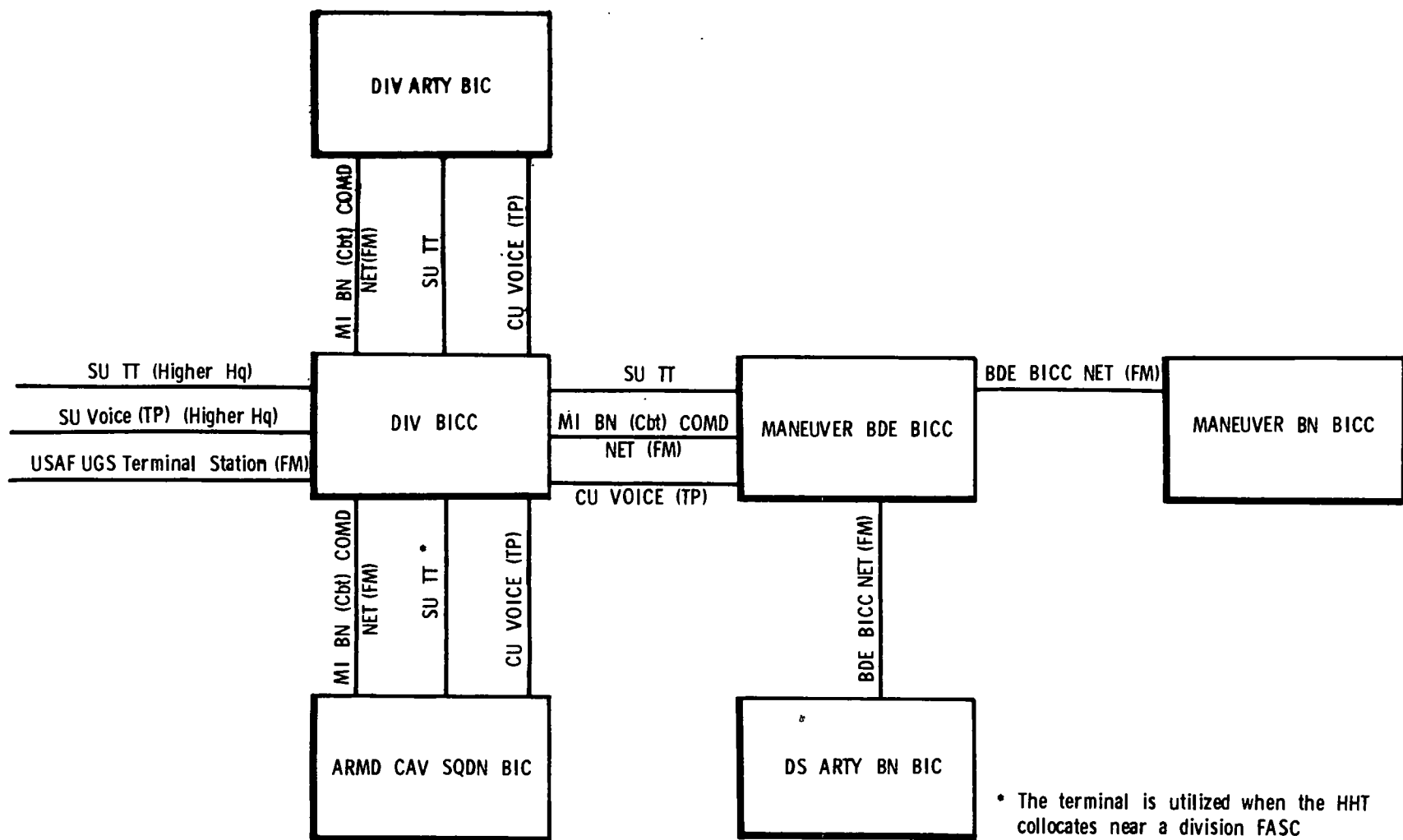


Figure 8-4. Type division BICC/BIC communications network.

8-5. STANO Functional Flow

STANO information may be transmitted separately or simultaneously over existing tactical signal communication nets in the division or over the circuits and radio nets provided for BICC/BIC use. In many instances, the same information will flow over several means at one time. The MI Bn (Cbt) places additional requirements on the personnel responsible for frequency management at all echelons, from theater army to division. The envisioned large-scale use of UGS will create the largest frequency and equipment management problem. Channels are required for all sensors used. Frequency interference is resolved at the lowest possible echelon. At division level, frequency management including that for UGS is under the general staff supervision of the division signal officer. Many of the transceiver/antenna equipment items, such as portables, remotely-controlled munitions detonation units, and associated

antennas designed for battalion use, are small and hand-emplaced. Large-scale subsystems are found in the division which require multiple transceiver units at relay and monitor sites for relaying, monitoring and for commanding UGS-field transmission (i.e., BASS III System). Such systems require associated unit and omnidirectional antennas which require large tower supports such as the AB/577 antenna mast and the ROHM 57-foot folding tower mast. Consideration must be given to installing these systems as well as providing for appropriate interface with USAF airborne and ground UGS readout terminal stations. Addition of BICC/BIC sole user circuits must also be considered in the communications management system. When all these elements are properly integrated into the existing system, a responsive and flexible communications network is provided to present the required STANO-related information to all echelons.

Section II. SIGNAL SECURITY AND ELECTRONIC WARFARE

8-6. General

a. Signal security and electronic warfare are command responsibilities which specifically include conscientious participation on the part of all individuals associated with communications-electronics devices.

b. An enemy, through employment of his signal intelligence and electronic warfare capabilities, can obtain tremendous amounts of information concerning our own STANO capability. Consequently, special attention must be given to our own signal security and ECCM during all phases of planning and execution to minimize our vulnerability to hostile SIGINT, ECM, and ESM efforts.

c. Logical decisions to properly employ STANO equipments require assistance from trained SIGINT and EW staff officers. For details see FM 32-5 regarding SIGSEC and FM 32-20 regarding EW.

8-7. Electronic Warfare

a. In modern warfare, tactical military forces depend increasingly on communications and electronic devices, including STANO items, for maneuverability, information gathering, and essential operational flexibility. Accordingly, communications are a critical facet of command and control. Many surveillance and weapons systems de-

pend on electronic devices such as radar and infrared. Tactical planning must include action to degrade or prevent the enemy's use of communications/electronics systems. At the same time, all possible action must be taken to insure effective use of communications/electronics equipment and systems within a U.S. Army force.

b. Electronic warfare consists of the field of electronic warfare support measures (ESM), electronic countermeasures (ECM), and electronic counter-countermeasures (ECCM). Total understanding of the field of electronic warfare also requires an understanding of the fields of signal intelligence (SIGINT) and signal security (SIGSEC). The importance of the components of electronic warfare—ESM, ECM and ECCM—and the related fields of SIGINT and SIGSEC must be recognized throughout the military structure. Electronic warfare is a potent weapon which can assist the commander in accomplishing his mission. Electronic warfare can also be used to limit or prohibit the use of friendly electronic devices. Electronic warfare will be used to some degree in all future warfare.

8-8. Enemy Electronic Countermeasures

a. Radios, radars, and other STANO equipment are used by field commanders during tactical operations. The enemy realizes just how essential

the use of this equipment is to any operation and will employ countermeasures (ECM) to override the signal of the opposing U.S. Army force. This, of course, has two adverse effects: It denies the enemy the intelligence being passed between the friendly units, and also denies the enemy the use of these frequencies for his own use. The operator of the equipment which is being jammed by the enemy must recognize that ECM is being employed and attempt to work through the jamming or take other measures to avoid the jamming such as changing frequency. These actions are electronic counter-countermeasures (ECCM).

b. Enemy action initiated to determine periods during military operations when the use of emitters is essential to the accomplishment of the mission falls within the scope of electronic warfare support measures (ESM). Further, determining the signal communications structure of the U.S. Army forces, the signal parameters of the signal communications equipment, and systems used by the U.S. Army and other technical information which supports enemy ECM activities also falls within their electronic warfare support measures (ESM). Enemy ESM activities must be recognized as supporting enemy electronic countermeasures activities.

c. Action taken by the U.S. Army to counteract enemy signal intelligence and EW efforts are ECCM and SIGSEC. ECCM and SIGSEC are of vital importance to operations at all levels in order to minimize the amount of intelligence information the enemy can derive through his signal intelligence SIGINT and EW activities as well as to minimize the amount of technical information derived through ESM in support of his electronic countermeasures operations. For this reason, personnel involved with electronic emitters, whether as a primary duty or on an occasional basis, must be thoroughly indoctrinated and trained in approved SIGSEC and ECCM procedures.

8-9. SIGSEC and Electronic Counter-Countermeasures

Signal security practices can limit the amount of

information the enemy requires to conduct ECM operations. The enemy can use ECM even if these ECM operations are not supported with sufficient technical information. The enemy will use his SIGINT and ESM capability to measure the effectiveness of his ECM operations. As the enemy jams friendly communications, he also uses his SIGINT and ESM facilities to determine the reactions of friendly operators to his jamming. Operators must not reveal that they are being jammed. The enemy finds it extremely difficult to determine if his jamming is effective unless the operators who are being jammed reveal this information to the enemy SIGINT and ESM operator. (See FM 24-1.)

8-10. Communications Security Considerations

a. STANO communications present the enemy with an especially lucrative source of information. Intercept and analysis of STANO communications can enable the enemy to derive information concerning the employment of STANO devices. Furthermore, analysis of communications patterns, traffic levels, and message content can provide the enemy with indicators of overall friendly operations. Technical information derived from the intercept of STANO communications can provide the data base for enemy electronic countermeasures activities which can degrade the ability of friendly forces to effectively deploy and use STANO devices.

b. It is imperative that communication security (COMSEC) principles be rigidly adhered to. Communications security is the protection resulting from all measures taken to deny unauthorized persons information of value which might be derived from the possession and study of telecommunications, or to mislead such persons in their interpretation of the results of such possession and study. COMSEC includes physical security, cryptographic security, transmission security, and emission security.

c. For details on COMSEC, see FM 24-18 and FM 32-5.

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CHAPTER 9

THE STANO PLAN

Section I. INTRODUCTION

9-1. General

a. Surveillance and target acquisition has been traditionally the responsibility of all combat units. With the introduction of new technology resulting in more sophisticated detection equipment, and the establishment of new techniques of employment, it becomes necessary to synthesize these separate plans and procedures into one coordinated plan at major unit level, the STANO plan.

b. The STANO plan incorporates the thought process, analysis and best courses of action which considers the commander's STANO assets and results in a coordinated action for systematic and effective employment of the resources available to the commander in the accomplishment of the surveillance, target acquisition and night observation portion of his overall mission.

Section II. THE STANO PLAN

9-2. General

The commander prepares his surveillance, target acquisition and night observation (STANO) plan in the framework of the STANO plan of higher headquarters. This plan integrates all combat STANO resources utilizing both ground and aerial surveillance means which includes visual observation, thermal imagery, infrared, image intensification, radars, unattended ground sensors, photography and special STANO devices. The STANO plan should insure that an enemy force cannot enter the unit's area of responsibility without early detection. It should also insure the detection, identification and location of targets in sufficient accuracy and detail to permit the effective employment of weapons.

acquisition is affected by the type of defense and/or offense adopted.

e. The provision of reconnaissance elements for task forces and the provision for shifting the emphasis of STANO resources as required.

f. Probable enemy movement and suspected enemy assembly or base areas which require a high degree of surveillance.

g. The requirement for surveillance in depth to the flanks.

h. The effect of reduced visibility caused by darkness, smoke or poor weather conditions.

9-3. Factors

In making his estimate of STANO requirements, both by day and night, the commander should consider the following factors:

a. What percentage of the perimeter or area of operation must come under surveillance and at what ranges are the requirements established?

b. STANO resources organic to the unit and available through other sources.

c. Whether a special STANO equipped force should be organized.

d. The extent to which surveillance and target

9-4. The STANO Plan

a. General. The STANO plan may include a ground surveillance, aerial surveillance and/or target acquisition plan. These plans may be prepared separately as an attachment to the operation order or included in the basic STANO plan, depending on the magnitude of the operation and area to be covered.

b. Ground Surveillance Plan. The ground surveillance plan covers the employment of patrols, observation posts, listening posts, unattended ground sensors, night vision devices and ground surveillance radars. The ground surveillance plan must be coordinated with movement plans to preclude inadvertent disclosure of the location of

friendly positions and activities when utilizing artificial illuminating devices (flares, searchlights, etc, and/or to prevent target acquisition elements from confusing friendly with enemy movements. Special codes for identification of units using active emitters must be included. The plan must take account of the enemy's capability to employ night vision devices and/or to disrupt the ground surveillance plan.

c. Aerial Surveillance Plan. The aerial surveillance plan covers the employment of aviation as-

sets organic and in support of the unit. In addition to visual observation and aerial photography, use of airborne radar, infrared, image intensification, and other electronic devices will be outlined.

d. Target Acquisition Plan. The target acquisition plan will delineate zones of responsibility and means to be employed in acquiring targets. It should also include target engagement criteria for procedures to be followed when targets are eventually acquired or, as a minimum, it should state where this criteria is outlined.

Section III. SURVEILLANCE AND TARGET ACQUISITION ANNEX

9-5. Format

Although the STANO plan has no prescribed format, the paragraphing for the operation order should be used as a guide to assure that no significant aspects are omitted. The following paragraphs portray the STANO plan in the form of an annex to the operation order. Any other format deemed suitable by the commander to clearly outline his plan of action can be utilized. An example of a typical surveillance and target acquisition annex to an infantry division operation order is shown at appendix C.

a. Situation. Any item of information which affects the STANO plan and which was not included in paragraph 1 of the operation order, or which needs to be expanded should be given here. For example, details of the STANO plans of higher and adjacent units should be added and/or referred to in this plan. The attachment and detachment of surveillance/target acquisition units or elements should be included here regardless of the fact that this information may have been included in the operations order or another annex.

b. Mission. A clear, concise statement of the task to be accomplished by the STANO elements will be made here. The mission may be to maintain a 24-hour all-weather observation of the battlefield, to determine militarily significant activity, locate targets for employment of fire and maneuver elements, damage assessment, a combination of these, or other related types of surveillance, target acquisition and night observation missions.

c. Execution. The general concept of the STANO plan includes any restrictive measures imposed by higher headquarters, i.e., active or passive surveillance, restricted use of white light, active measures planned to deceive the enemy, etc.

(1) Resources.

(a) List all the units organic to the unit with STANO assets, and itemize the general types of equipment/systems available. To avoid repetition when numerous annexes are written, these resources can be included in the division SOP and referred to in this annex.

(b) List sources nonorganic to the unit where STANO support may be obtained through attachment, operational control, or by other means.

(2) *Tasks.* Specific tasks to be accomplished by each element of the command charged with the execution of tactical missions are given here.

(3) Coordinating instructions.

(a) Coordination agency (ies).

(b) Restrictions.

(c) Details on coordination of effects of devices between adjacent commands.

(d) Instruction/restrictions on use of devices as friendly navigation aids.

(e) Liaison.

(f) Any special destruction instructions that deviate from standard procedures, to prevent STANO equipment from falling into enemy hands should be included here.

(4) *Limitations.* Effects caused by poor visibility (line-of-sight) terrain, natural or man-made concealment, and/or enemy air defense capabilities against surveillance by aerial means.

(5) Surveillance countermeasures.

(a) Policy.

(b) Method.

(c) Coordination.

d. Service Support.

e. Command and Signal.

(1) Coordinating agency.

(2) Details of special communications necessitated by STANO plan.

(3) Special signals, code words or acronyms necessitated by the STANO plan.

CHAPTER 10

USE OF STANO IN SUPPORT OF TACTICAL OPERATIONS

Section I. INTRODUCTION

10-1. General

STANO operations are primarily in support of the combat intelligence function. They are conducted in coordination with other unit missions. In addition, a variety of STANO systems support and facilitate the conduct of operations, particularly night operations. This chapter provides guidance for the employment of STANO systems by combat maneuver units in all types of combat operations. Variations in the type of operation and in climate and terrain conditions dictate modification of techniques or the development of new procedures. Basically, the principles remain the same.

10-2. Night Combat

a. Night combat is an integral part of all operations because combat units operate under all environmental conditions in daylight or darkness to accomplish their missions. The principles of night operations are the same as those for daylight operations. Limited visibility offers the combat division opportunities but it also creates problems. Certain techniques can be used to exploit the opportunities and to overcome the difficulties of night operations. The combat commander must consider the effects of darkness on his own and the enemy's relative combat power to insure that plans are made to exploit any opportunities and to overcome special difficulties.

b. The reduced visibility during night operations affords increased concealment to both friendly and enemy forces. It also complicates the problems of control and coordination in the maneuver of combat forces.

c. Night airborne or airmobile operations are feasible and are considered a normal part of night attack operations.

d. Available night vision devices, such as thermal imagers, infrared, and image intensification

devices used in conjunction with ground and aerial radars and unattended ground sensors enhance the chances for success.

e. Night combat is characterized by a decrease in the effectiveness of aimed fire and the corresponding increase in the importance of close combat and supporting fires.

f. Morale of troops, both friendly and enemy, is highly sensitive to physical and psychological factors. Reverses and failures at night generally affect troops more than the same reverses in daylight. Well-trained troops, confident of their ability to fight at night, can use these psychological factors to their advantage.

g. Darkness increases difficulty of movement, maintenance of direction, and control; therefore, objectives in night attacks are not as deep as those for daylight attacks. More time is required to execute movements and emplace weapons at night than in daylight. Simple schemes of maneuver with well-defined objectives and routes simplify control. Leaders must be well forward in attacking echelons. Navigational aids and combat surveillance equipment, such as ground surveillance radars and night vision devices, assist forces in maintaining direction and control. Timing is critical in night operations.

h. Subordinate commanders must have adequate time for reconnaissance. During daylight they should be able to observe the terrain over which their units will move. This allows commanders time to identify terrain features that will aid in maintaining direction at night.

i. Enemy use of nuclear weapons may affect the vision of attacking or defending troops and render them temporarily less effective. Fires created by nuclear munitions may assist in identification of objectives and maintenance of direction, but they may also silhouette both enemy and friendly forces.

j. All combat and combat support units can be

used at night; however, their effectiveness may be reduced. The effectiveness of armor is increased by the use of illumination. This includes tank-mounted infrared devices and searchlights. Illumination facilitates the adjustment of artillery fire.

k. Illumination by diffused lighting from rear areas assists in troop movements, logistical opera-

tions, and the operation of supporting weapons.

l. Availability of STANO assets, especially individual night vision aids such as electronic binoculars and weapons night sights as well as the enemy's STANO countermeasure capabilities, will influence the commander's decision on the method of night attack to be employed.

Section II. OFFENSIVE OPERATIONS

10-3. General

Offensive operations, whether conducted during the day or night are actions designed to enable the commander to impose his will on the enemy, set the pace and course of the battle, exploit enemy weaknesses and meet unexpected contingencies. Units employ a combination of fire and maneuver to accomplish offensive missions. Their fires include nuclear, chemical, and conventional munitions.

10-4. Planning and Preparation

STANO systems influence the planning sequence in the following manner:

a. *Terrain.* They permit more effective use of terrain by increasing the commander's capability to collect decision-oriented intelligence and target intelligence. Specific actions include, but are not limited to, increasing the effectiveness of line-of-sight observation, and monitoring movement along avenues of approach and on key terrain (fig 10-1).

b. *Intelligence and Target Acquisition.* They provide enemy target locations as well as furnishing information on his movement.

c. *Night Combat.* Night operating aids, which include night vision devices employed in conjunction with navigational and surveillance aids, provide a much improved capability to conduct tactical operations during darkness.

d. *Coordination and Control.* STANO systems contribute to command and control by—

(1) Identifying lines of departure during periods of darkness.

(2) Vectoring friendly units toward their objectives by ground surveillance radar.

(3) Locating units by means of ground surveillance radar.

e. *Security.* Commanders provide all-around security to insure early warning and reliable information of approaching enemy forces. Radars, un-

attended ground sensors, light intensification devices, thermal viewers, and IR devices cover areas in front of and to the flank and rear of unit positions. Unattended ground sensors can be air dropped or hand emplaced by units passing through an area, and are capable of detecting movement at a distance from readout sites.

10-5. Movement to Contact

a. Movement to contact is an offensive operation to gain or reestablish contact with the enemy. Its purpose is the early development of the situation to provide an advantage prior to decisive engagement.

b. Security is obtained through the use of security forces and enhanced by rapid, aggressive movement and continuous ground and air surveillance. STANO systems enhance the security effort by serving as both alert/warning and target acquisition means.

(1) Army aircraft perform visual and photographic reconnaissance missions. Army aircraft, equipped with side looking airborne radar and forward looking infrared (SLAR, FLIR), maintain continuous coverage of the unit's front, flanks, and rear to detect enemy movement toward or around the unit. Other Army aircraft, equipped with infrared sensors and photographic equipment, supplement and reinforce the SLAR coverage. The SLAR system capabilities for in-flight processing and interpretation, and for simultaneous reception at the ground terminal stations assist in detecting ambushes and enemy buildups in the division area of interest.

(2) Radars, long-range night observation devices, and unattended ground sensors are positioned at defiles, on flanks, and along avenues of approach into the unit's area of interest. The FSCOORD can plan field artillery fires in these areas to provide an "artillery ambush" in conjunction with unattended ground sensors used for target acquisition. Particular attention is given to probable location of enemy units especially those



GROUND SENSOR INPUTS



AERIAL SENSORS
AND GROUND RADARS

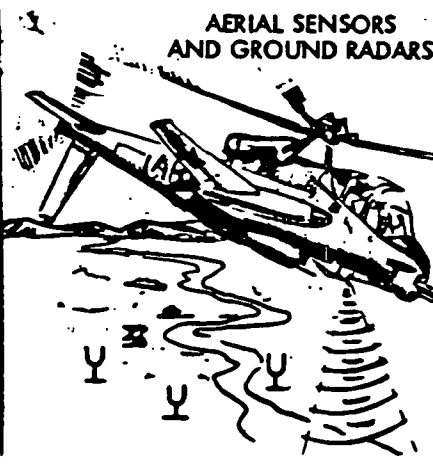


Figure 10-1. Preparatory surveillance and target acquisition.

large enough to seriously impede the advance. Once these are detected by UGS, portions of the follow and support forces or the attacking force reduce these pockets of resistance. As these forces bypass the seeded fields, and if it is determined that they are no longer needed, the UGS may be recovered. If it is determined that they will be used by the rear area forces, arrangements are made to pass readout responsibility to these forces as the attacking force passes beyond the fields.

(3) During the movement to contact (depending on the distance to the target and line-of-sight peculiarities), the radars can be used to scan the route of march to complement UGS in detecting ambushes and also to aid in command and control of the attacking forces by vectoring them onto the objective. Once the objective is secured, the radars are displaced to it, and used to scan forward to aid in detecting counterattacking enemy forces.

(4) Army helicopters conduct airborne personnel detector missions.

(5) Thermal imaging and image intensifying devices (handheld and crew served) are used by elements of the march units to aid in detecting key terrain features and checkpoints and speed of the march column. They reduce the possibility of premature detection of the attacking forces by the enemy defenders, and thereby reduce the command and control problems inherent in a night march to contact.

10-6. Reconnaissance In Force

a. The reconnaissance in force is a limited objective operation to discover and test the enemy's disposition and strength and to obtain other intelligence. Although its primary purpose is reconnaissance, the force may discover weaknesses in the enemy disposition which, if promptly exploited, may enhance tactical success. The reconnaissance in force may be part of either defensive or offensive operations.

b. STANO systems support a reconnaissance in force operation by increasing security. Airborne systems can be used as outlined in paragraph 10-5b(1) above. Radars and sensors can be used for flank security of the reconnaissance units. In case of a withdrawal, UGS can be left behind to develop information on enemy movement.

10-7. Coordinated Attack

a. General. The offensive action of the division is habitually characterized by the coordinated em-

ployment of firepower and maneuver to close with and destroy or capture enemy forces. The coordinated attack is the offensive operation most frequently referred to or thought of when the term "attack" is used.

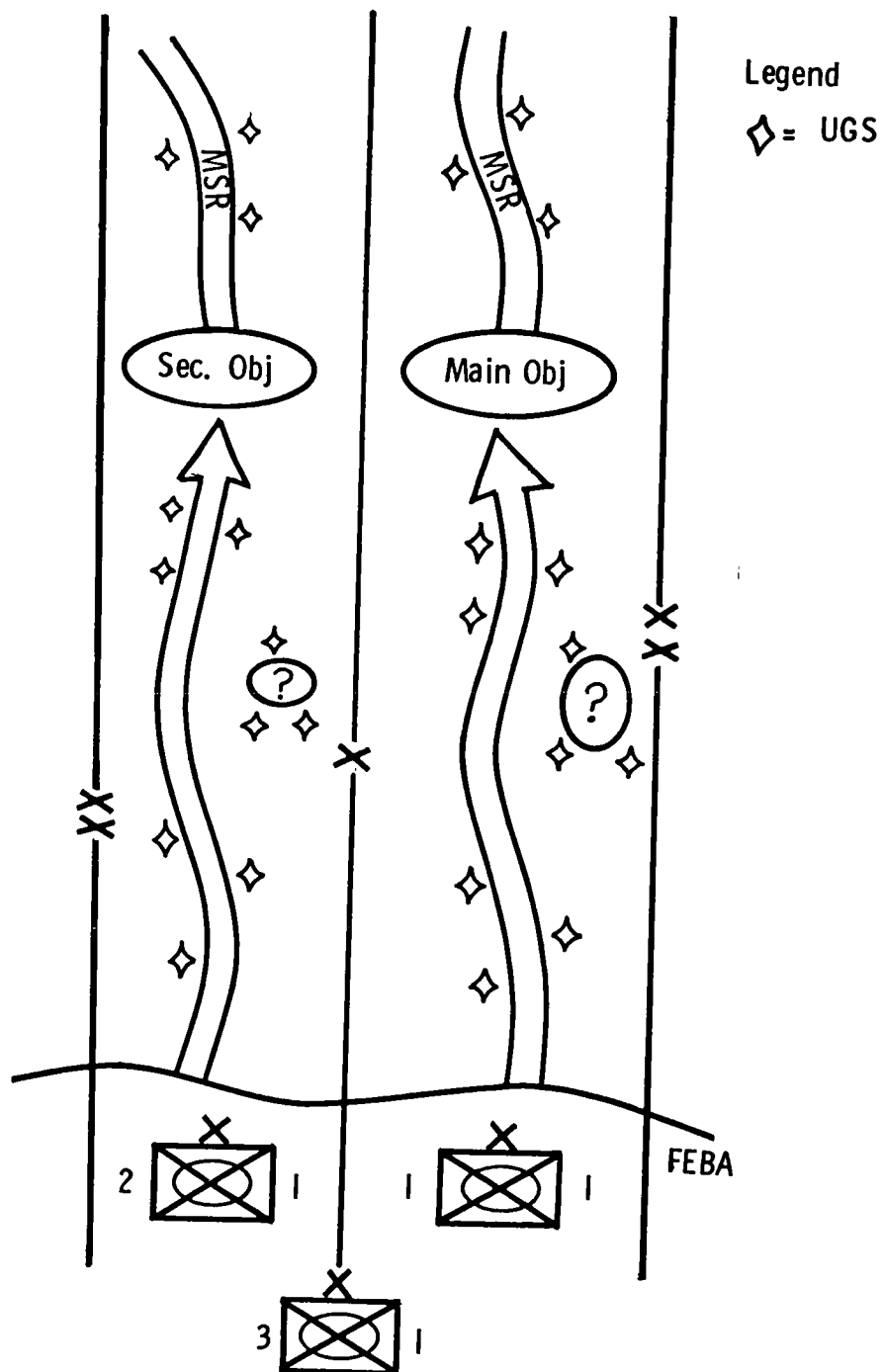
b. Conduct of the Attack. Commanders planning a day or night attack must provide for and use all appropriate STANO items of equipment (fig 10-2).

(1) Surveillance of the battlefield and target acquisition systems are established using airborne means (visual, radar, photography, and airborne personnel detectors), optical devices, radars, sound-ranging equipment, and UGS. STANO equipped combat and reconnaissance patrols move throughout the battlefield. Particular attention is given to developing intelligence information. During periods of reduced visibility, the equipment listed above is supplemented by long range night vision devices of all types, visible and infrared searchlights as appropriate, and thermal viewers.

(2) Before launching the attack, routes of approach to and from the objective are seeded with UGS using Army air assets or by coordination with other Services. Depending on the distance to the objective, sensors are either readout entirely by the ground forces or, if necessary, read initially by the USAF and passed to the attacking force as they move within readout range. These sensors aid the attacking force by reducing the possibility of unexpected contact during the attack movement; they also assist in controlling the forward progress of the attacking units.

(3) Properly employed, STANO devices improve the commander's ability to command and control his maneuver forces. STANO equipment is well suited to operations requiring stealth and security, and it significantly increases the commander's influence and flexibility during periods of limited visibility. They will also aid the attacker in placing more accurate, observed fire on the enemy defenders. Once the attack is discovered, and if illumination is desired, airborne searchlights may be used in conjunction with ground searchlights and pyrotechnics for orientation and night illumination. (Techniques of illumination are outlined in FM 20-60.)

(4) Maintaining direction while moving is extremely difficult at night during nonilluminated operations; consequently, measures taken must insure that the attacking units are oriented on the objective. Techniques using STANO equipment that may be used for orientation and to maintain direction are—



1. ASSUMPTIONS:

- 1st Bde makes main attack on right to secure Obj. 1.
- 2nd Bde makes supporting attack on left to secure Obj. 2.
- 3rd Bde: Reserve follows 1st Bde.
- ⊙ = possible enemy force yielded by intelligence, exact size, composition, and location unknown.

Figure 10-2. Use of UGS in a coordinated attack.

(a) *Patrols.* If patrols operate beyond the FEBA, guides with filtered lights or devices emitting an IR light may be placed from the patrol point of departure (PD) to the patrol line of deployment.

(b) *Infrared illumination.* If the enemy has a limited infrared detection capability, IR may be used to illuminate the maneuver area and to delineate boundaries. Tank or other vehicle mounted searchlights and aircraft mounted searchlights may be used. Emissions from IR headlights and searchlights in conjunction with night vision optics, organic to the vehicle, electronic binoculars, and metascope are used to assist in negotiating terrain and maintaining proper direction of attack.

(c) *Radars.* Ground surveillance radars may be oriented along a direction of movement, and used to report and correct deviations in the direction of the attacking force. Radar used in conjunction with other friendly activity can detect prearranged signals such as a soldier swinging a helmet or canteen and establish both distance and direction of the individual's location.

(d) *Night vision devices.* Crew-served weapons night vision sights mounted on the caliber .50 machineguns on the mechanized infantry armored personnel carriers are used in maintaining various formations with other elements of the team and also proper direction. Night vision sights and optics organic to tanks are used in this same capacity.

(e) *Individual night vision sights.* These devices are used in the handheld mode by mechanized platoon leaders and fire team leaders to assist in maintaining control and the proper formation for both mounted and dismounted operations. In addition, night vision sights permit surveillance of the area for enemy activity or targets on the move.

(f) *Bearings.* Radar and infrared detectors may be used by maneuvering elements for navigation by taking bearings from pre-established or known radar or infrared emitters.

(g) *Unattended ground sensors.* Time, terrain, and availability permitting, sensors are employed by aircraft, artillery, mortars, and patrols along the boundaries or contact points to assist in navigation.

(5) When the objective is taken, STANO systems aid in its consolidation by reducing the command and control problems. During the consolidation and reorganization phase, ground radar, and sensor emplacement teams and other STANO ele-

ments displace forward to preplanned positions on the objective. Sensor fields are emplaced to the front by hand, organic air, or artillery to aid in detecting counterattacking enemy forces. Remotely detonated munitions and mines are integrated with these fields into the defensive scheme. Active and passive vision devices such as radars, night sights for TOW and DRAGON weapon systems, night sights for individual and crew served weapons, metascope, binoculars, driver's goggles and/or periscopes, and night vision periscopes, that are an integral part of tank's fire control system, should be used to conduct surveillance of enemy avenues of approach until first light (BMNT) or until a surveillance effort has been established. The effort includes positioning of listening posts, patrols, ground surveillance radars, or the emplacement of unattended ground sensors. Plans should be made for use of organic illumination, or illumination available for DS units, or from air cavalry and Air Force supporting units. If it is necessary to deny an avenue of approach to the enemy or to engage a fleeing enemy or an enemy force conducting a counterattack, then maximum illumination should be employed.

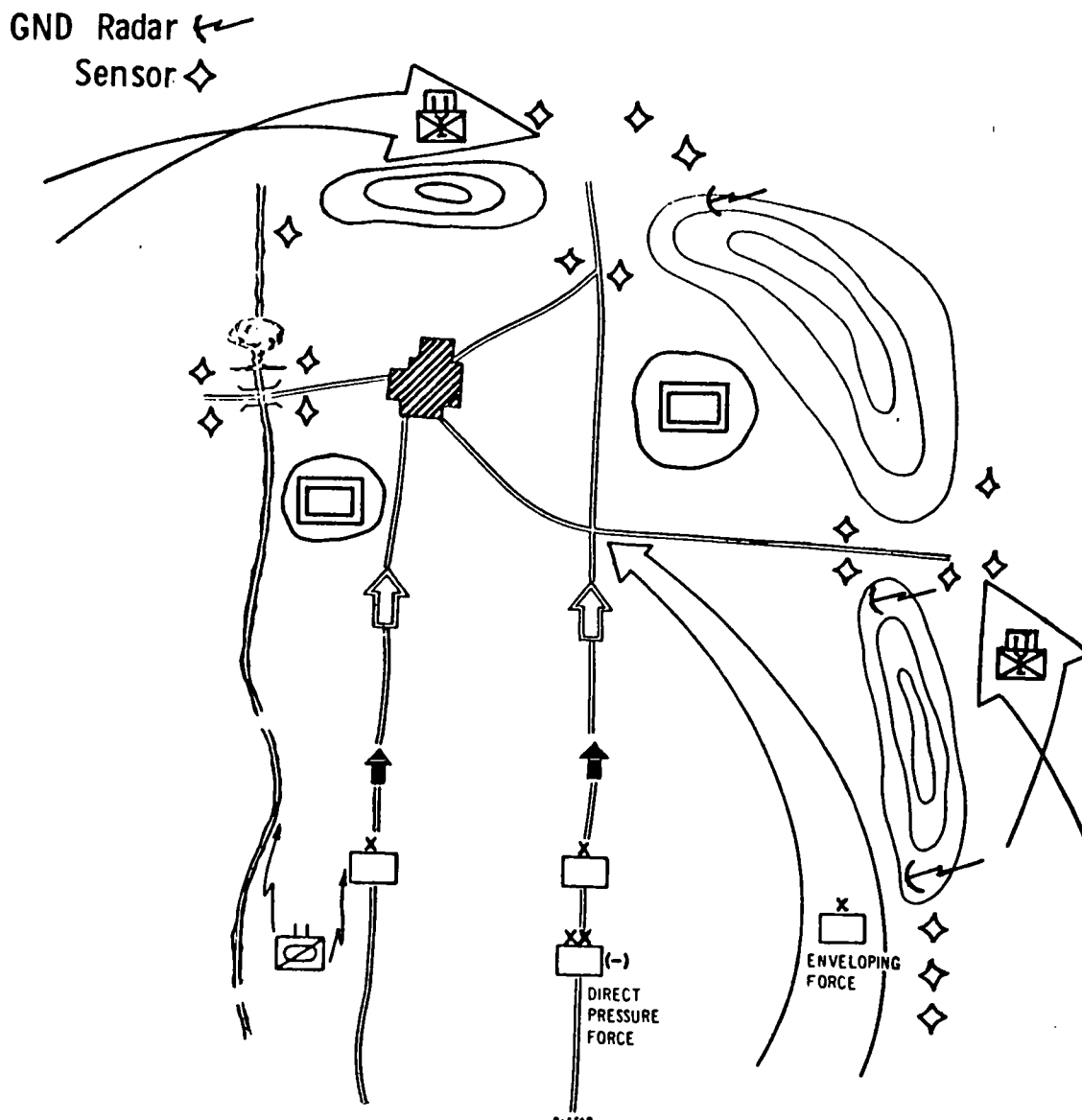
10-8. Exploitation and Pursuit

a. General.

(1) Exploitation is the following up of gains to take full advantage of success in battle. It is a phase of the offensive that destroys the enemy's ability to reconstitute an organized defense or to conduct an orderly withdrawal in the face of threatened destruction or capture.

(2) The pursuit normally follows the exploitation. It differs from the exploitation in that its primary function is to complete the destruction of the enemy force which is in the process of disengagement. While a terrain objective may be designated, the enemy force itself is the primary objective. Figure 10-3 depicts the division conducting a pursuit.

b. *Use of STANO Systems.* With the distribution of more effective passive night vision aids and illumination means to unit level, it is possible to conduct an exploitation or pursuit at night as well as during daylight. The possibility of such night operations following successful daylight or early night attacks must be considered and planned for in the development of the initial attack plan. An exploitation force operated through a gap or around a flank usually is assigned a physical objective deep in the enemy rear. At night the pursuit must also use terrain



NOTE: Airmobile force is normally employed by higher headquarters.

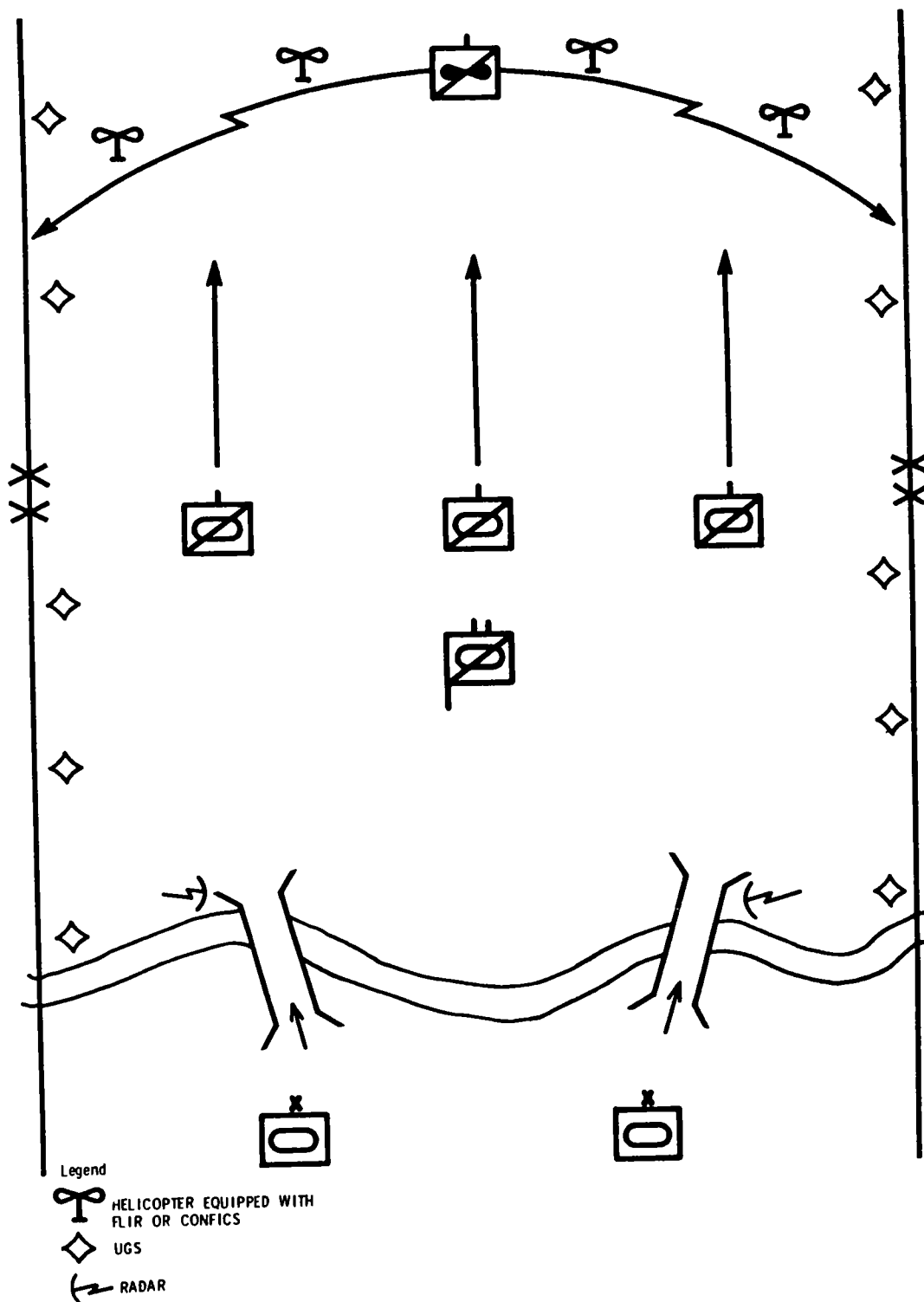
Figure 10-3. Division conducting a pursuit.

objectives as control measures. The attack should be aggressive, making maximum use of night vision aids. Terrain permitting, night exploitation forces advance on a broad front using multiple directions of attack for the task force. Use of night vision devices permit rapid, controlled movement. Passive and active night operating aids assist in the maintenance of positive control. In addition, each commander is responsible for the security of his unit. A task force engaged in exploitation or pursuit is, because of its position deep in enemy territory, particularly vulnerable to enemy attack on its flanks and rear and to harassment by small pockets of resistance and

guerrilla forces. Therefore, security becomes increasingly important. This security can consist of reconnaissance platoons using night vision devices, augmented by UGS implanted by air, and by artillery or patrols using ground surveillance radars. These ground surveillance radars are positioned to scan the exposed flanks. The exploiting force performs aggressive air reconnaissance to the front and flanks to maintain contact with enemy forces, to assist in locating enemy strong-points, and to avoid ambushes.

10-9. Covering Force

a. The purpose of the covering force is the early



Armored Cavalry Squadron advancing in zone as covering force during a river crossing by a division

Figure 10-4. Covering force.

development of the situation, the provision of security for the main body, and the prevention of unnecessary delay of the main body. Covering force missions may be broad and may include attacks to destroy enemy resistance, secure and control key terrain, or contain large enemy units. A

unit, especially an armored cavalry unit, may be assigned a covering force mission for a larger force. The airmobile units may also be employed in this role, particularly in restrictive terrain (fig 10-4).

b. Ground surveillance radars, medium and long

range night observation devices (NOD), small starlight scopes, thermal viewers, and night vision goggles are employed to assist in providing flank security and to search beyond the line of contact. Terrain permitting, these devices are collocated in a position well forward to detect any movement by the enemy that might indicate reinforcement or change of disposition. Flank security is provided by these devices, with the radars detecting enemy movement, and the NOD providing target identification. Aircraft flying night reconnaissance missions should make maximum use of all active and passive night vision aids.

10-10. Air Cavalry and Airmobile Offensive Operations

a. General. This paragraph discusses considerations for employment of STANO systems by air cavalry and airmobile units in night offensive operations. Offensive air cavalry and airmobile action at night and under conditions of reduced visibility may often succeed where a daylight operation would be impractical. Darkness increases problems of control, movement, and navigation of aviation units. Night operations may be executed to give the air cavalry airmobile forces a tactical and psychological advantage over the enemy. Details of such operations are contained in FM 1-15, 1-100, 1-110, 17-36, and 57-35.

b. Air Cavalry Units.

(1) *General.* The air cavalry units normally attack in conjunction with other elements to accomplish assigned reconnaissance, surveillance, and security missions. Air cavalry units may attack when the mission requires the destruction of the enemy encountered, when it is necessary to reduce an enemy position to continue the mission, or when the mission is to seize a particular objective. It may attack with or without reinforcements, when used on an independent mission. Normally, an air cavalry unit, such as a troop, engages in night attack action as a unit. The aero scout platoon may be employed in a surveillance and target acquisition role. The aero weapons platoon may be employed as an aerial base of fire. The aero rifle platoon normally is employed dismounted as the maneuvering force to close with and destroy the enemy. However, to be successful, this mission must be within the offensive capabilities of a dismounted rifle platoon (fig 10-5).

(2) *Air cavalry troop.* The troop normally is not used in a planned offensive role or as an attacking force to seize an objective at night. The organization and equipment of the troop are of

such a nature that the unit should not be unnecessarily exposed to loss. Its capabilities for sustained night offensive action are limited. The inherent limitations imposed by night operations are largely overcome by detailed planning and well-trained and disciplined troops.

(3) *Aero scout platoon.*

(a) Reconnaissance operations are less effective at night. Night reconnaissance in support of the night attack generally is limited to reconnaissance of the area of operation to detect the enemy movements, positions, and reinforcements.

(b) In conducting a night reconnaissance mission, the aero scout squad makes maximum use of night vision aids. Detailed planning and coordination of illumination over specific areas of interest or on the objective are accomplished prior to night reconnaissance operations. Illumination normally is provided by mortars and artillery. This illumination may be augmented by tank searchlights from the armored cavalry units on the ground and aircraft equipped with illuminating lights or flares, when available. Teams position themselves where they can best observe and fire without being illuminated themselves (fig 10-6). The scout aircraft can employ passive, infrared, night vision devices to provide a night fighting capability. These devices can be used to aim the weapons system at night when normal visual methods are not possible in the target acquisition, fire control mission. Additionally, scout aircraft using thermal imaging devices, can detect targets for acquisition or intelligence information.

(4) *Aero rifle platoon.* Daylight air reconnaissance utilizing STANO navigational aids is made of the intended landing zone (LZ) when possible. Planning should include the formation in which aircraft will approach the LZ, lights to be used, illumination support, reference points for locating the LZ when necessary, and planned methods of extracting the dismounted elements.

(5) *Aero weapons platoon.* When operating in support of the aero rifle platoon in the night attack, the aero weapons section provides close fire support during the assault, attack, consolidation and reorganization following the attack, and during the extraction of the platoon from the pickup zone. The aero weapons section leader coordinates with the air cavalry platoon and illuminating element to insure that adequate illumination and the heaviest volume of fire is available during the assault phase of the dismounted

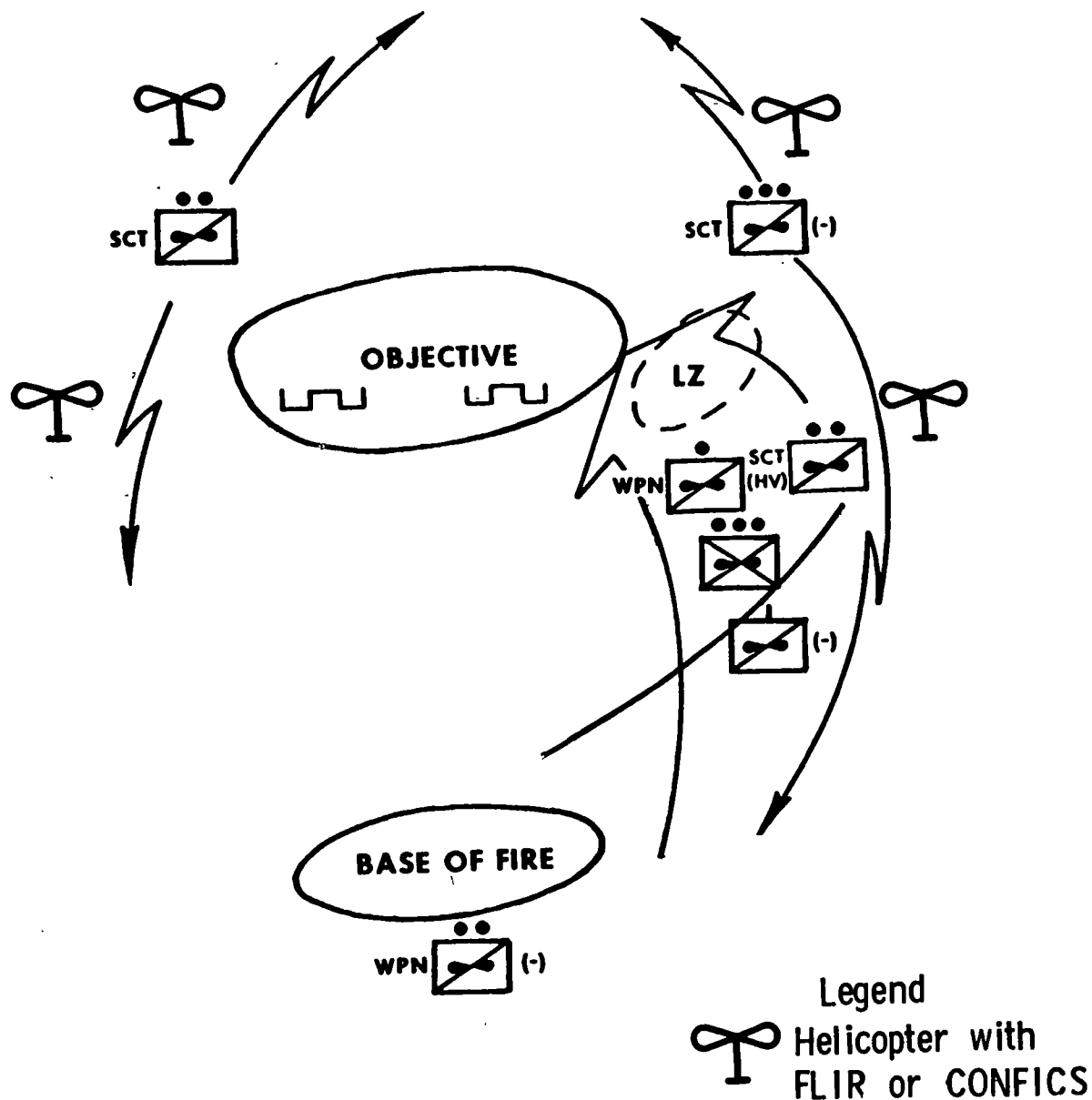


Figure 10-5. Cavalry troop night attack.

attack. Airborne night vision aids are used to the maximum.

(6) *Actions on the objective.* Security to the front, flanks, and rear is immediately established. Aero scout elements provide security at greater distances than the ground elements. Maximum use is made of passive night vision devices. This security includes maintaining visual contact with any enemy forces that may have been driven from the objective if light conditions permit.

c. *Airmobile Units.* Details of airmobile operations are contained in FM 57-35. Planned use of STANO systems should be presented in the surveillance and target acquisition annex of the unit's

ground tactical and air landing plans. (See chapter 9 for further discussion of surveillance and target acquisition annex.)

(1) *Reconnaissance.* When conducting airmobile operations day and night reconnaissance by the aviation unit commander and the airmobile force commander is desirable. Night reconnaissance is best accomplished using passive night vision devices from aircraft. This reconnaissance can be greatly assisted by the use of helicopters equipped with navigational aids such as LORAN Retransmission System (LORES). When the location for a landing zone has been designated, a LORES equipped helicopter is flown across it. The

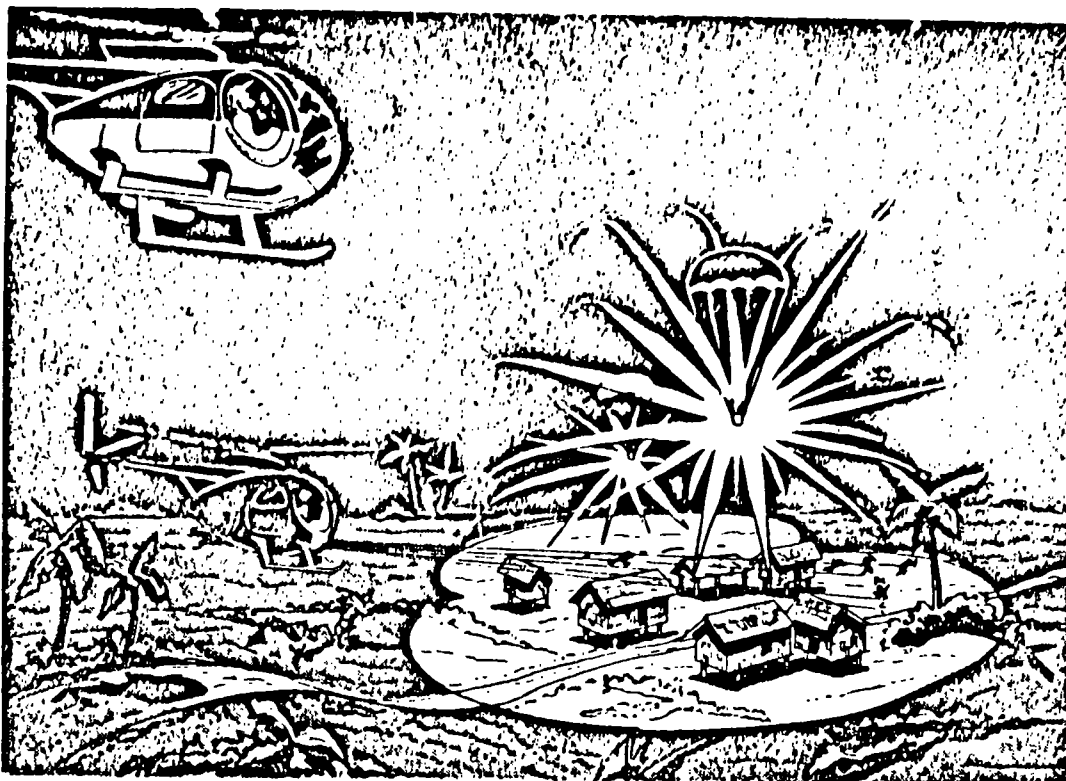


Figure 10-6. Night illumination, observation, and firing by flare.

LORES ground station determines the aircraft location as it passes over the proposed landing zone. This same technique can be utilized in conjunction with a sensor equipped aircraft in order to determine enemy activity in the landing zone area. This can be expanded to the point where the landing zone is selected during daylight hours; then during darkness the LORES equipped aircraft can guide a sensor equipped aircraft, such as one using the Southeast Asia Multisensor Armament System for Huey Cobra (SMASH), back to the zone to check it for enemy activity. The use of the above procedure will aid in deceiving the enemy. The passage of a single helicopter over or near a potential landing zone is less obvious than a helicopter circling over the same area.

(2) *Control measures.* The LZ are lighted by pathfinders or unit terminal guidance personnel after introduction into the LZ with the initial assault echelon. The normal methods include use of field lighting sets, illumination fires by artillery, flares dropped by aircraft, strobe lights, IR devices and metasopes. It is also possible to land at night using only flashlights, or the helicopter landing light. The security force, once landed, prepares the night LZ for the arrival of the remainder of the battalion. Pathfinders and terminal guidance teams may rely on passive devices to

accomplish LZ preparations. Special control measures include planning for maximum use of the night operating aids to assist in identifying friendly troops, assembly of the ground force, and delivery of effective fire into hostile or suspected areas. These measures are included in the STANO Plan.

(3) *Illumination.* The employment of illumination during an airmobile night attack is essentially the same as for any other type of night attack. Definitive guidance on the control and phasing of illumination must be provided. Target illumination may be provided by airborne searchlights, vehicle mounted searchlights, or illuminating rounds from mortars and artillery, and flares delivered by Air Force and Army aircraft.

(4) *Ground tactical operations.* The maximum use should be made of night vision devices to expedite the location of premarked assembly areas, personnel and equipment, as well as to provide LZ security. If the battalion becomes engaged upon landing, individuals should make full use of night vision devices and other night operating aids to effectively gain and maintain the initiative. Night vision aids assist in reestablishing unit integrity at the earliest practicable time. When the night attack objective is at a considerable distance from the LZ and enemy resistance is

expected to be light, the battalion may use an approach march. Control and orientation of move-

ment is simplified, and more efficient use is made of passive night vision devices.

Section III. DEFENSIVE OPERATIONS

10-11. General

a. Defensive operations, whether conducted during the day or at night, are actions to prevent, resist, repulse, or destroy an enemy attack. The defense is undertaken to develop more favorable conditions for subsequent offensive operations, economize forces in one area in order to apply decisive force elsewhere, destroy or trap a hostile force, deny an enemy entrance to an area, or reduce enemy capabilities with minimum losses to friendly forces. The fundamental forms of defense are the mobile defense and the area defense. Most defensive operations are some variation of either the mobile or area defense, or both.

b. On the defense, it is possible to maintain a more thorough surveillance over the battlefield than is possible in the offense. Generally, the defender has the opportunity to organize the defensive area and hence to emplace STANO equipment on most favorable terrain locations.

c. Although there are differences in night defensive techniques, doctrine for the night defense is generally the same as for the daylight defense. Planning and control measures are more detailed for the night defense. Counterattacks or spoiling attacks to be executed during the hours of darkness avoid complicated schemes of maneuver or intricate coordination procedures which cannot be accomplished because of reduced visibility.

10-12. Planning and Preparation

Defensive plans and preparation should consider the employment of STANO systems (fig 10-7).

a. Security. Commanders provide for all-around security to insure early warning and reliable information of approaching enemy forces. Radars, unattended ground sensors, light intensification devices, thermal viewers, and IR devices cover areas in front of and to the flank and rear of unit positions. The entire security area is under continuous and complete surveillance by means of overlapping STANO systems. STANO devices are weighted toward the security area and the leading portion of the forward defense area.

b. Terrain. Note is made of key terrain features which can be readily identified at night, either by the unaided eye or with the aid of night vision

devices. Consideration is given to selecting locations for image intensification devices, active and passive IR devices, searchlights and ground surveillance radars which will provide the optimum observation of the probable avenues of approach from all directions. Tentative locations of UGS fields should be selected forward of the security area, in the security area, and in the forward defense area.

c. Defensive Positions. Positions are made capable of mutual support by fire and illumination. Observation posts and listening posts (OP/LP), ground surveillance radar, passive and active night vision devices, and on-call illumination and fires also cover perimeter gaps. Night vision devices can be used to check the condition and alertness of personnel in friendly defensive positions.

d. Illumination. Aids to night vision advance in two stages. Initially, when the enemy is farthest away, passive devices (thermal light intensification) are used. Active pink light (near IR), white light and radar devices (searchlights, flares) should not be used unless friendly forces will gain a significant tactical advantage or the enemy initiates its use. If used these devices should be turned on when the enemy is 500-800 meters in front of the defense position. Artillery and mortar illumination and fires are coordinated by the fire support coordinator. Details on the use of battlefield illumination are contained in FM 20-60.

e. Intelligence. A successful defense depends on timely and accurate information of the enemy and the ability of forces within the defense area to react rapidly. Surveillance, target acquisition, and night observation equipment is used to obtain information on enemy positions, assembly areas, and avenues of approach. A total overlapping coverage of the battlefield by all available STANO means is used to insure complete surveillance of the defensive area.

f. Surprise. The night defense minimizes the possibility of surprise by the enemy. STANO systems greatly decrease the chances of surprise enemy actions.

g. STANO Systems. Surveillance, anti-intrusion, illumination, and night observation devices are employed in the night defense in conjunction

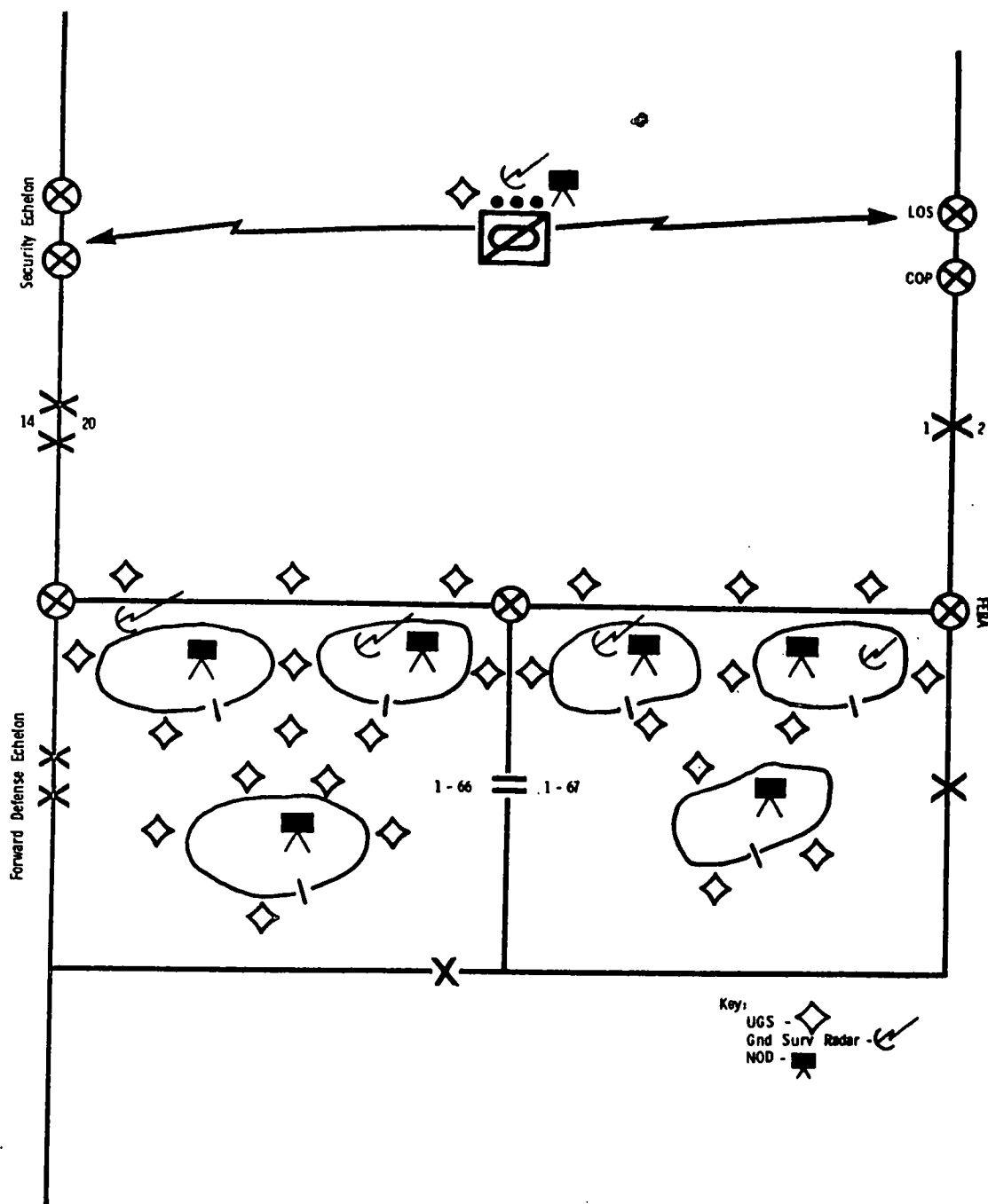


Figure 10-7. Use of STANO devices in the defense.

with each other. For example, detections made by radar are confirmed by night vision devices such as image intensifiers or thermal imagers. Detections made by unattended ground sensors are confirmed by a second sensory principle such as seismic detection which are confirmed by acoustic detections, radars, or another secondary means. In addition, night vision devices, such as starlight scopes, are employed in pairs for overlap of sur-

veillance coverage. Each observation post or listening post should have two or more sensing devices, preferably different types of equipment.

10-13. Conduct of the Defense

Because of the greater contribution of STANO devices at night, this paragraph will outline the use of STANO devices in the night defense. The

principal differences between the day and night defense are in the organization of the security area and the greater use made of night vision devices, surveillance aids, anti-intrusion devices, and artificial illumination to compensate for reduced natural visibility.

a. Security Area.

(1) In defensive operations, unattended ground sensors (UGS) will be used in conjunction with other sensors, radar, image intensifiers, and thermal imaging equipment to achieve complete and total overlapping surveillance forward of the FEBA. This surveillance, when combined with the actions of the security echelon, will provide information required by the commander for the most effective conduct of the defense.

(2) UGS alert the security echelon of enemy approach to the FEBA. A mix of UGS (e.g., seismic, pressure, infrared, magnetic, acoustic, disturbance, electromagnetic) should be employed forward of general outpost positions (GOP), between GOP and line of observation and surveillance (LOS), between LOS and combat outpost positions (COP), and to the rear of the security echelon. When strings of UGS are placed perpendicular to avenues of approach, and parallel to road networks, information gained from these sensors will indicate the enemy disposition and strength as he approaches the FEBA. This assists the security echelon in generating the maximum delay and allows the commander of the defensive forces to adjust his defense for maximum effectiveness. Support may be required from other services to emplace UGS well forward of the security echelon, and to monitor UGS after security echelons have withdrawn. Artillery, mortars, and Army aviation can be used to emplace UGS in locations where the enemy situation prohibits hand emplacement.

(3) Ground surveillance radars (GSR) may be employed with the security forces to extend their surveillance capability. Radar teams employed with the GOP or COP forces normally revert to their primary mission when the security forces are withdrawn. Although GSR provides an excellent means of obtaining information, it complements rather than replaces other surveillance means. The GSR can provide accurate direction and distance of enemy movement for the GOP and COP forces. While the GSR is used primarily at night or under conditions of poor visibility, it may be used just as effectively during periods of good visibility.

(4) Searchlights, binoculars, metascopes, and night vision devices may be used by the security force to illuminate, observe, and fire weapons at enemy forces.

(5) Coordinated use of two or more surveillance means provides location, direction of movement, and type and size of an enemy force. The security force can follow enemy movement beyond the range of UGS fields if GSR monitors the location. UGS and/or GSR can be used to monitor point targets such as bridges, defiles, and road junctions for enemy activity. When activity is discovered, command detonated munitions, pre-planned artillery fire, armed helicopters, or close air support can be used to destroy the enemy.

(6) Radar and night observation aids are used on the line of observation and surveillance (LOS) and subsequently on the combat outpost (COP) to detect approaching enemy forces. Normally the enemy is first detected by passive devices. Indirect fires are called for and adjusted. Active pink and white light and radar should not be used unless friendly forces would gain a significant tactical advantage or the enemy initiates its use. If tanks are present on the COP, they may be used to illuminate the enemy by xenon equipped tanks using the visible light mode, and engaged at ranges of 2,500/3,000 meters. This method provides excellent point target acquisition and long-range engagement. However, it provides almost continuous signature which degrades the security and deception of the defender against enemy forces that are capable of detecting and reacting to active systems on the battlefield. To maximize security, the defender may use artificial illumination provided by artillery to achieve adequate target recognition. As the enemy comes within the viewing range he is fired upon by weapons with passive night viewing devices. If illumination is to be continued, it must be shifted to the flanks or to a sufficient distance behind the enemy to prevent neutralization of the night vision device. This method provides for retention of maximum security and deception by the defending force. The COP withdraws before becoming engaged in decisive combat.

b. Forward Defense Area.

(1) *General.* The division forward defense force organizes the forward area bounded by the FEBA, the flank, and the forward brigade rear boundary. All units, regardless of whether they are organized in an area defense, employ their organic STANO equipment in basically the same manner.

(2) *Area defense.* The forward units on the FEBA are alerted to the impending enemy attack and prepare to receive the attack and to receive elements of the LOS/COP as they withdraw to, or through their positions. Detection and readout devices such as radars, image intensification devices, and UGS monitoring equipment placed in support of the LOS or COP are rapidly emplaced to assist in the detection of the enemy's advance. Initially, passive devices, then active-invisible devices are used to expose the enemy as he approaches the FEBA. This permits the rapid adjustment and placement of indirect and direct supporting fires upon the enemy. As the enemy approaches, night vision devices, such as the starlight scope and crew-served weapons sight, are employed to place accurate fire on the enemy's attacking formations. As a general rule, before the enemy begins his final assault, weapons are not fired until targets are visible. Normally, crew-served weapons will not fire until the final protective fires are called. However, individuals with weapons equipped with night vision devices fire at the enemy as he comes within range of their devices and the effective range of their respective weapons. Leaders may direct that some individuals equipped with night vision devices fire tracers at the enemy and thereby enable effective fires to be placed against the enemy formation by individuals not equipped with night vision devices. Effective fire may be placed on area type targets through the use of range cards, predetermined firing data, and stakes. When the enemy starts his assault, the platoon leader calls for final protective fires in the threatened area. Hand grenades, claymore mines, and other explosive devices are used to disrupt or repel the enemy's attack.

(3) *Mobile defense.* The considerations for the conduct of the defense at night are essentially the same as those outlined in (2) above. Greater use is made of observation and security groups at night because of the wider gaps existing between battalions, which increases the possibility of enemy infiltration in strength. These groups are equipped with night vision and surveillance devices to assist in detecting the attacker.

(4) *Perimeter defense.* All units adopt the perimeter defense when they are separated from the remainder of their parent unit either by enemy action or by its assigned mission. This defense is frequently used when a unit is in a reserve position or in an assembly area. (See paragraph 10-15.)

c. Reserve Area. Techniques for employment of

STANO equipment organic to the unit acting as a reserve force does not differ from those concepts practiced by a force found within the forward defense area.

10-14. Counterattack

Counterattack plans are prepared concurrently with plans for the defense. After the counterattack plan has been prepared with assumed penetration, STANO devices such as ground surveillance radars, infrared equipment (both ground and aerial platform mounted), and image intensification devices may be employed to monitor forward and lateral enemy movements. Most important, STANO devices will aid in determining the most advantageous time to launch the counterattack. This critical time is denoted as a time prior to enemy reinforcement of his position and complete organization of his defenses. All available fire support means should be employed to eject the enemy from the objective, to prevent him from reinforcing, and to destroy his force once he starts to withdraw. Close and continuous coordination is required in the employment of organic direct and indirect fire weapons, artillery, armed/attack helicopters, and tactical aircraft due to the close proximity of friendly and enemy forces. A most effective method for the commander of a counterattack force to command and control his force would be to use a helicopter mounted with a thermal imaging device. Night counterattacks normally are conducted using all available STANO equipment.

10-15. Perimeter Defense

Perimeter defense is required in most combat situations. The perimeter defense may be supported by other nearby maneuver units in similar dispositions, or only by artillery fires or tactical air support. (An example of a perimeter defense is shown in figure 10-8.) Positioning of organic STANO equipment within the company perimeter is dependent upon the terrain, atmospheric conditions, and the tactical situation. Equipment should be positioned for all-round coverage of unit positions regardless of weather conditions. When the number of available items precludes all-round, all-weather coverage, the equipment should be positioned to attempt to achieve maximum coverage of avenues of approach or major threat areas (primarily armor), and should be moved as necessary to provide maximum coverage as the situation changes. Devices which sense different "signatures" should be positioned to reinforce each

other on a continuous or overall basis. Unattended ground sensors placed along avenues of approach or within "dead space" zones of organic radars and major threat areas can provide early warning to the force commander. Organic, lightweight radars should be positioned to cover the most critical avenue of armor approach into the unit position. Radars can be employed in conjunction with any other sensor, since the radar does not interfere with their operation. Other sensors such as UGS and thermal imaging devices should be used to confirm radar sightings, since considerable operator training is necessary before target identification can be accomplished by radar alone. On the other hand, the radar may be used to improve target information being obtained from other sensors which provide very limited signature sensing. Organic radars should be operated continuously when the unit is in a defensive position, and operators should be rotated as required. Devices such as the starlight scope are assigned to individuals for the purpose of surveillance and target engagement. These devices should be positioned to allow

surveillance/target engagement all across the front of the unit, with priority given to positions which allow fires to be placed on critical approaches. They will be operated continuously over assigned sectors of observation/fire and operators will be rotated as necessary. The starlight scope may be employed either mounted to an individual weapon or in a handheld mode. An instrument such as the metascope is used primarily by small unit leaders for movement and signalling. It may also be used for observation when IR searchlights are available. It can be positioned on the unit's perimeter to allow identification of patrols. The metascope requires an IR illumination source. The IR illuminator on the metascope should be used sparingly to avoid compromising the unit's position. Operation of the device will not interfere with the operation of other sensors. Since the area of influence of a force in a defensive perimeter is relatively narrow, continuous surveillance of that area beyond the area of influence is critical to the success of the defensive operation, particularly if conducted at night.

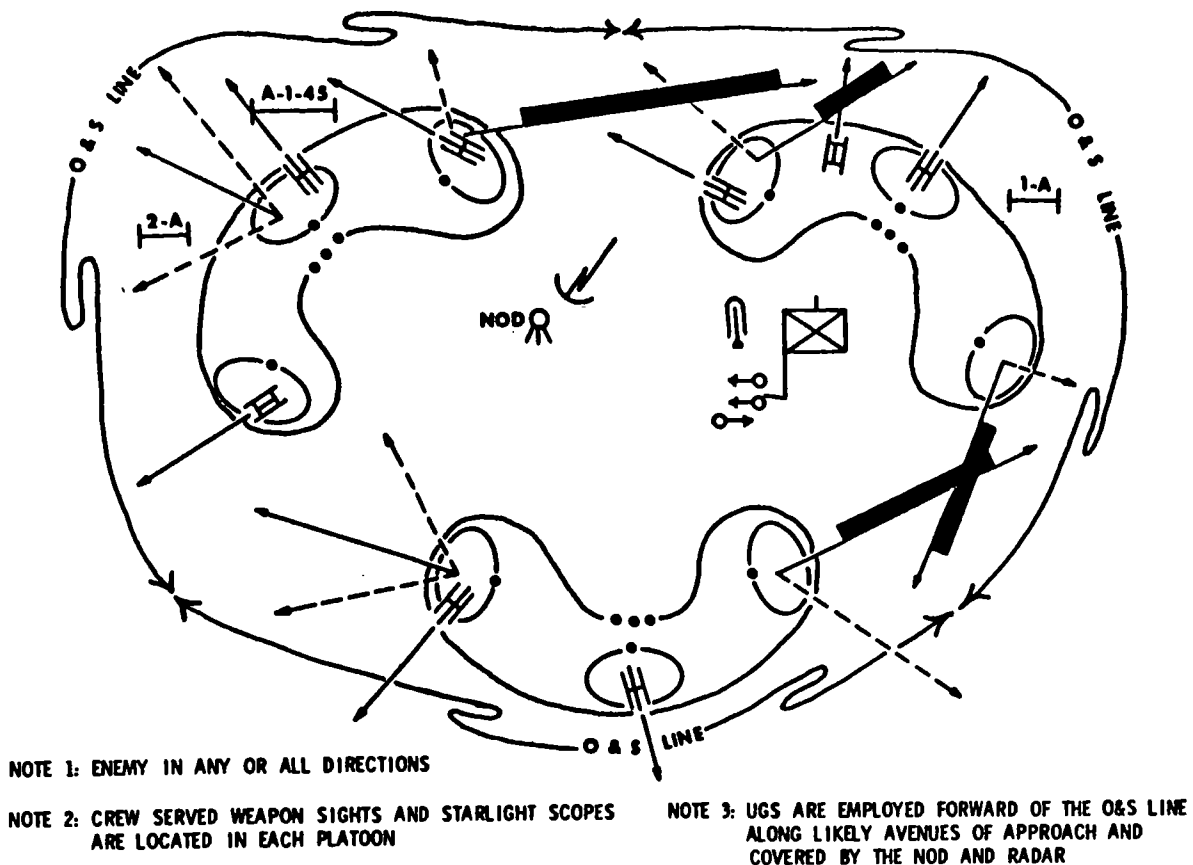


Figure 10-8. Rifle company in perimeter defense.

Section IV. RETROGRADE OPERATIONS

10-16. General

A retrograde operation is an organized movement to the rear or away from the enemy, and can be conducted during the day or night. Surveillance, target acquisition, and night observation (STANO) devices can be used to increase the effectiveness of a retrograde operation by assisting movement, control, and coordination, aiding security and acquiring enemy targets. Retrograde operations are classified as one of three basic types:

a. Withdrawal. An operation in which all or a part of a deployed force disengages from the enemy.

b. Delaying Action. An operation in which a unit under enemy pressure trades space for time while inflicting maximum punishment on the enemy without becoming decisively engaged.

c. Retirement. An operation in which a force not in contact moves away from the enemy.

10-17. Basic Considerations for Employment of STANO Devices

a. Planning. Retrograde operations usually are more difficult to control than other operations, particularly if conducted during periods of darkness. Proper use of illumination means, night vision, and surveillance devices are incorporated early in the planning.

b. Security. In order to maintain freedom of action, the force conducting a retrograde movement must avoid decisive engagement. To counter such an eventuality and to assist in detecting enemy movements, commanders can employ radars and unattended ground sensors (UGS) with security elements to cover gaps, avenues of approach, flanks, and the rear of the unit. The use of unattended ground sensors (UGS) forward of the FEBA provides information concerning the enemy strength and direction of advance, which allows for planning and the orderly conduct of a retrograde operation. Ground surveillance radar equipment can be employed with UGS and early warning devices to detect the areas of greatest enemy pressure, to improve the security of the forward elements, and to improve the effectiveness of interdiction of the enemy routes of approach. Aircraft equipped with surveillance devices also assist in maintaining contact with the enemy. When rear guards are used the use of radar equipment, airborne surveillance, and UGS

assist these units in their mission of blocking and counterattacking enemy penetrations. The advantage of friendly movement during periods of reduced visibility is emphasized. Under these conditions, the employment of night observation devices (NOD), radars, unattended ground sensors, and other surveillance devices to cover the trails, will aid the movement and possibly preclude the retiring force from being defeated in detail by monitoring the movement of enemy units.

c. Movement. Night vision and surveillance devices largely diminish the previous distinctions between daylight and night retrograde operations. It is difficult to conceal a retrograde operation from enemy radars or IR devices. For this reason, the mobility differential between the friendly and enemy forces is a principal consideration when planning a retrograde action. The rate and accuracy of movement of a retrograde force is greatly facilitated by the use of night vision devices and land navigation aids. For example, the use of infrared driving aids and blackout lights and vehicle-mounted NOD by the withdrawing elements can improve their tactical movement. Vehicles utilizing IR headlights in conjunction with the vehicle's organic night vision equipment and electronic binoculars can allow a unit to maneuver with improved security and deception. Tanks equipped with xenon searchlights can depress the light in front of the vehicle's path, thus improving the commander's ability to negotiate the terrain. Additionally, a smoke screen may be employed in conjunction with the above mentioned technique.

d. Monitoring and Interdiction of Enemy Movement. As units withdraw, accurately hand-emplaced UGS along likely enemy avenues of approach and along the withdrawing element's routes permit monitoring of the enemy's movements, allowing maximum interdiction of his advance. If time does not permit hand-emplacement, unattended ground sensors can be air dropped and monitored by division aircraft. The number of sensors would vary according to the commander's estimate of the situation and the availability of the sensors being emplaced. Data received from these sensors can be used for intelligence or target acquisition or both. Remotely fired munitions may be used in conjunction with hand-emplaced UGS.

10-18. Conduct of the Delaying Actions

This paragraph outlines the use of STANO sys-

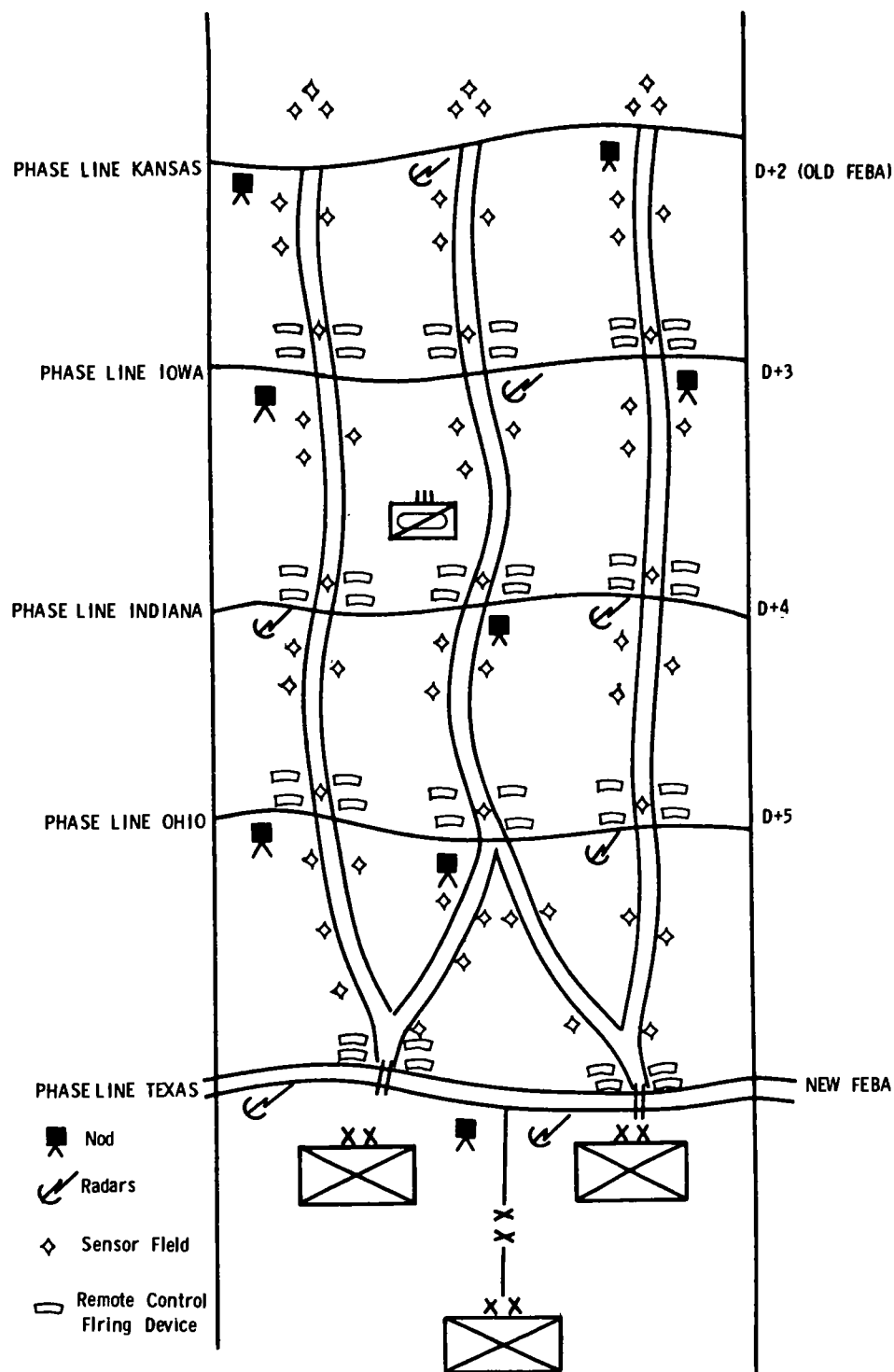


Figure 10-9. Use of STANO devices in a delaying action.

tems in a typical delaying action. The use of STANO systems in withdrawal or retirement operations is similar. The initial situation indicates a two division force deployed along Phase Line Kansas. Increasing enemy strength dictated a retrograde operation to Phase Line Texas. The divi-

sions in contact were ordered to conduct a delaying action covering a 5 day period as outlined in figure 10-9.

a. Unattended Ground Sensors.

(1) Original fields forward of old FEBA (D+2) are used to monitor approaching enemy

to Phase Line Kansas (1st delay line). Remote fired munitions and mines are employed in conjunction with these fields to confuse and delay the enemy.

(2) Fields are emplaced between Phase Lines Kansas and Iowa along routes of movement from one phase line to the next by the retrograding ground troops to aid in monitoring the enemy advance. Remotely fired munitions and mines are again employed to delay and confuse. Concurrently, the air cavalry troop may be used to seed areas between the main avenues of approach, especially in areas where the armored cavalry regiment has no units. This provides an economy of force measure to aid the regiment in determining if it is being flanked by a major portion of the enemy force.

(3) Use of UGS by the retrograde force remains the same until Phase Line Ohio (D+5) is reached. At this point, which is within the line formed by the GOP and supporting fire range of the forces occupying the new FEBA, the delaying force forms into march columns and conducts a passage of lines. UGS between Phase Line Ohio and the new FEBA (Phase Line Texas) are emplaced by the units occupying the new defensive line, while the covering force is conducting the retrograde. This is accomplished by sensor personnel from the MI battalion (combat), and by using air-delivered UGS from organic division helicopter assets or requested USAF delivery, or artillery delivered UGS. These sensors can aid in determining enemy advance to the FEBA, as in a normal defense role, and aid in determining progress of the retiring retrograde force by noting direction of movement and checkpoint passage times. This can be especially useful at night, when the delaying force would probably retire. Remotely detonated munitions in this area are placed by the defending force and used to delay the enemy's approach to the FEBA, as in the defense.

(4) The delaying force will have only short-range readout devices (such as portatales) and will soon pass beyond the monitoring range of the fired sensors as they move back. Provisions are made to turn over those sensors to the USAF which then can be monitored by high performance aircraft. This area then falls into the battlefield interdiction area of the USAF. When the airborne (USAF) readout receives activations, it becomes USAF responsibility to react. Range of monitoring for the retrograding force can be increased by having airborne readouts using organic division aircraft or corps aircraft.

b. Radars.

(1) At D+2, organic cavalry radars are used in the same role as in the defense, to detect approaching enemy forces, pinpoint them, and provide a basis for engaging them by fire and maneuver.

(2) Because of the time required to set up the radars, and the fact that they do not operate while moving, it is envisioned that they will be displaced to Phase Line Iowa (D+3) (etc.) with the first elements moving to it. This holds true for either successive or alternate position delay. Once emplaced on Phase Line Iowa, they aid the force by locating and vectoring the withdrawing friendly forces into delay positions (especially useful at night), and locating and pinpointing approaching enemy forces.

(3) At Phase Line Ohio, delaying force radars are not used. Prepositioned radars of the defending force at the new FEBA assume the role of the retrograding force radars and vector friendly forces during the passage of lines and locate and pinpoint the approaching enemy.

c. Retrograding Force Air Assets. During the entire retrograde, organic aircraft (rotary wing) of the air cavalry troop fly perpendicular to the lines, using visual means during daylight to detect the enemy. At night, aircraft equipped with low-light systems such as CONFICS and SMASH perform surveillance to help pinpoint concentrated enemy forces. These systems allow the aircraft to engage effectively at night if the commander desires. They can be used in conjunction with radars and UGS in that these devices show location of the enemy and give the pilot an area to search. Once on station, he can determine size and composition of forces.

d. Corps Air Assets. The corps aerial surveillance company can be tasked to provide fixed-wing aircraft to fly similar search patterns to the organic aircraft of the division. These aircraft, equipped with radar and thermal detection equipment, complement the other STANO devices of the division.

e. Airborne Personnel Detectors. Airborne personnel detectors mounted on helicopters are used to detect submicroscopic airborne combustion particles such as campfire smoke, exhaust fumes from motor vehicles, which indicate present or recent human activities in a given area.

f. Thermal Imaging and Image Intensifying Devices (Handheld and Crew Served).

(1) While moving, appropriate devices are

used to control the direction and rate of march during periods of reduced visibility. They aid march units in determining landmarks critical to navigation, speed, the rate of march, and reduce command and control problems.

Section V. OTHER TACTICAL OPERATIONS

10-19. Introduction

Combat units operate under all conditions of climate and in all types of terrain. Regardless of the mission and operational environment, the principles of employment of STANO devices are the same for all tactical operations; however, the application of these principles may vary. This section discusses some of these variations in different organizational environments.

10-20. Stability Operations

Stability operations are conducted to assist a friendly nation in preventing or defeating an insurgency. The general doctrine for stability operations is covered in detail in FM 31-16, 31-23, 31-85, 33-1, 33-5, 41-10 and 100-20.

a. Tactical Operations. Due to the elusive nature of guerrillas and their ability to strike at any point over wide areas, it is essential that opposing conventional forces cover large areas. This requires continual small unit operations and increases the necessity to employ lightweight radars, night observation devices, unattended ground sensors, airborne personnel detectors and other airborne systems, outposts, and ambush patrols to continuously track and fix enemy locations. Night operations are of particular importance during stability operations. Guerrilla forces characteristically conduct many of their movements and operations at night. They attempt to use darkness to conceal their activities and to limit the effectiveness of the host country's and allies' superior weapons and mechanized equipment. Consequently, it is essential that extensive and effective night operations be conducted to defeat insurgent forces. Although these operations may be more difficult to perform than during daylight, such STANO devices as starlight scopes, night observation devices, and radars will assist in defeating the attacking guerrilla force.

b. Security Operations. Protection of areas, installations, and communication routes is a recurring mission of tactical units in stability operations.

(2) While stopped on delay lines (and at the new FEBA), they aid in determining location of advancing enemy forces and allow defenders to place accurate, aimed fire on the enemy during periods of reduced visibility.

(1) *Surveillance.* The entire area being protected as well as adjacent areas are kept under surveillance. Although aerial reconnaissance including photographic and infrared devices frequently locate large guerrilla movements and resupply operations, small units moving at night, particularly in rugged terrain or under heavy foliage, are extremely difficult to locate. The principal means of close-in surveillance during the hours of darkness are ground observation posts (OP). OP use visual and audio means to detect enemy movement. Artificial illumination, sound amplification devices, thermal image devices, night observation devices, night crew-served weapons sights, UGS, and radars are used to aid the surveillance effort. The basic difference between surveillance in conventional operations and surveillance in stability operations is that in the latter larger areas are covered by small units and a greater requirement exists for 360° surveillance. Radars and unattended ground sensors can be used to detect patterns of enemy movement. Coordination is made with supporting Army Security Agency units. Unattended ground sensors should be emplaced in vacated fire bases and patrol locations, as guerrilla elements frequently move into those areas after friendly elements move out. Sensor activations can be used for intelligence information or to call for immediate response by artillery or aerial fire support. Figure 10-10 illustrates the use of STANO equipment.

(2) *Patrols.* Patrols cover the area to be protected. In addition to locating guerrillas, active patrolling makes guerrilla movement more difficult, thus helping to keep them out of the area. Patrols concentrate more of their efforts on likely routes of movement and around populated areas. With the aid of night vision devices, radars, illumination, and UGS, patrols can more accurately locate and destroy guerrilla forces. Radars can track approaching enemy forces, verify UGS activations along avenues of approach, monitor the rate of movement of the patrol and assist pinpointing the exact location of any ambushes. Techniques of patrolling are contained in FM 21-75.

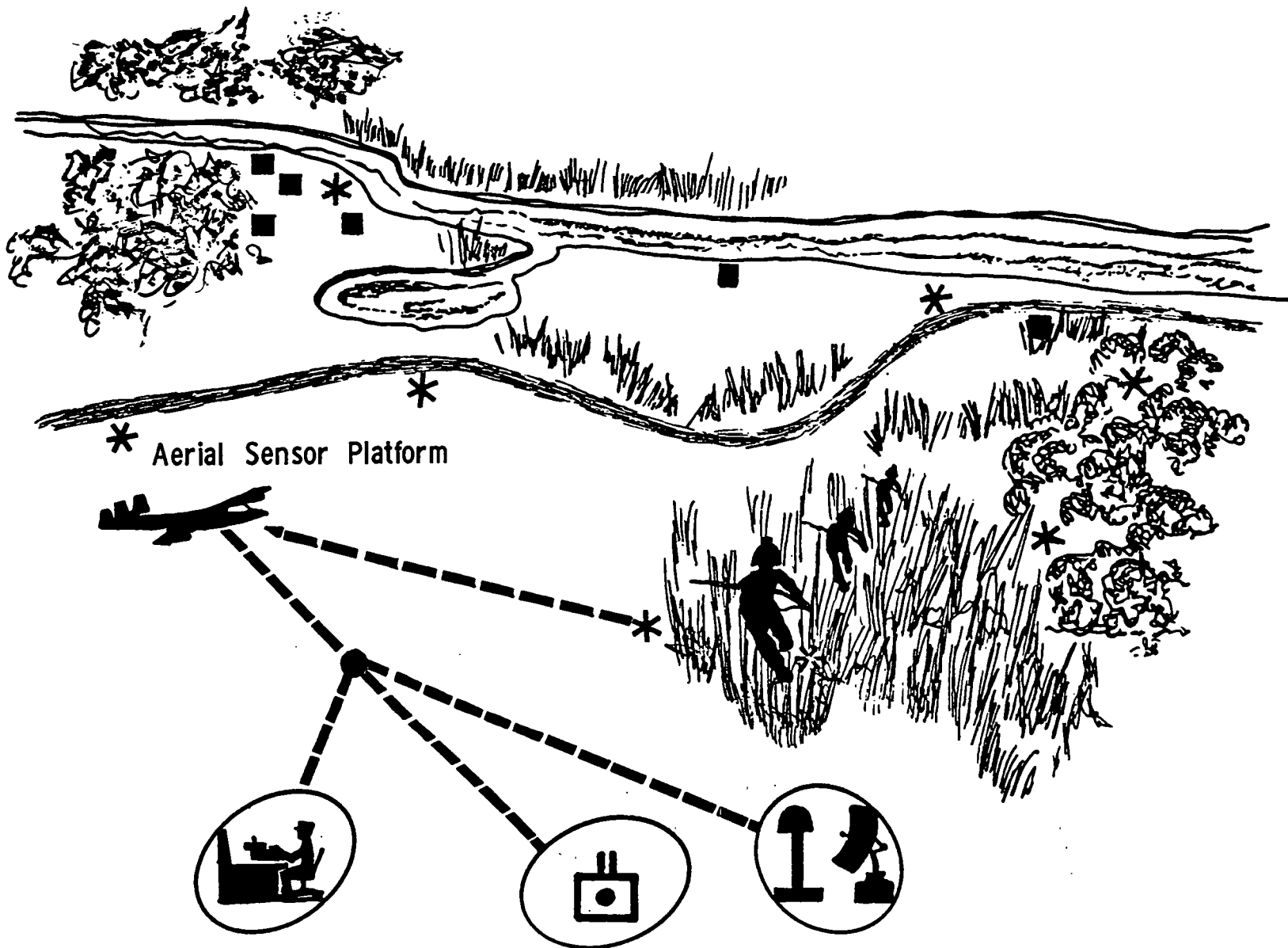


Figure 10-10. Target acquisition and surveillance.

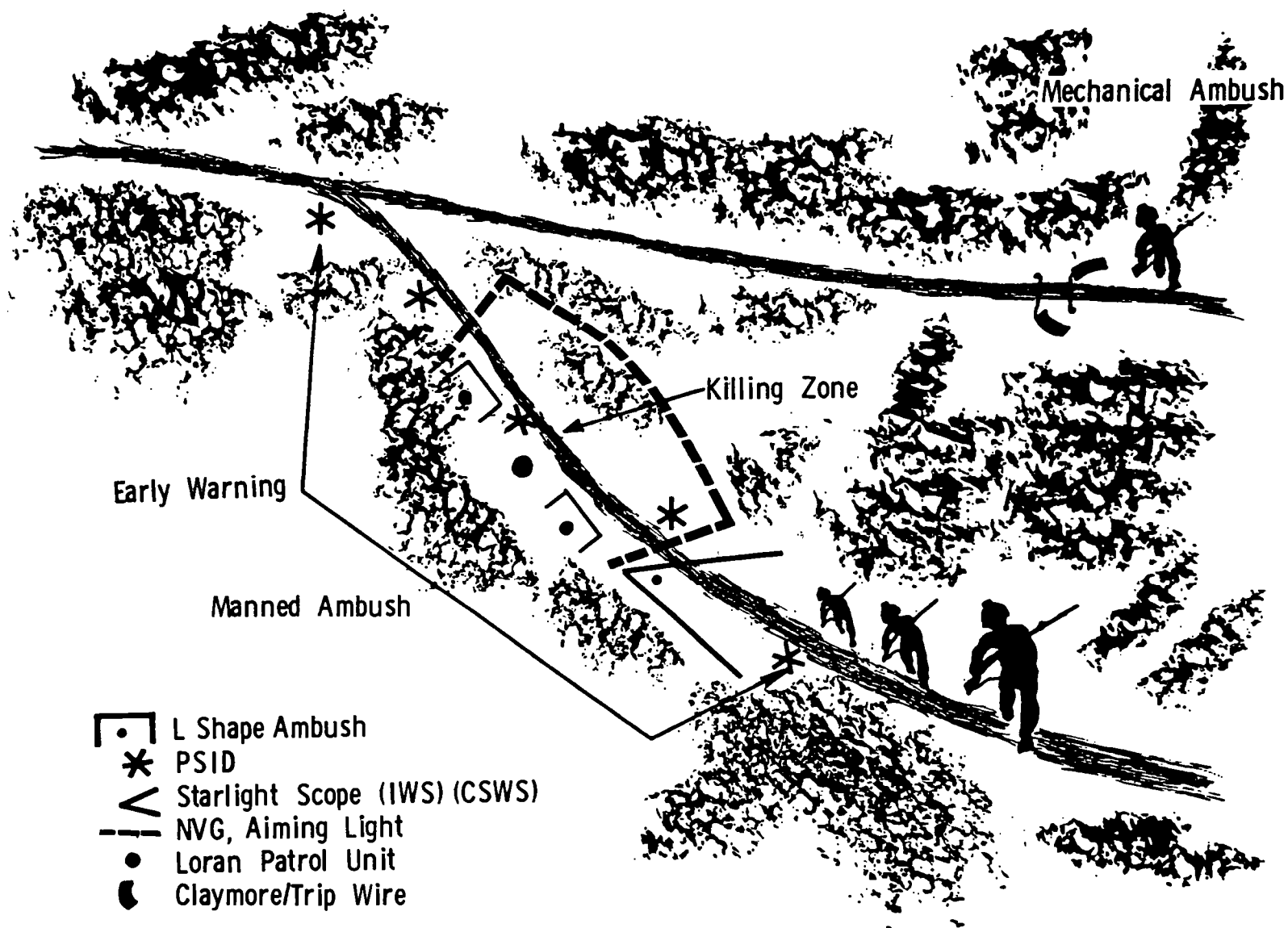


Figure 10-11. Night ambushes.

(3) *Ambushes.* In addition to the patrols, ambushes both manned and mechanical are established on likely routes of insurgent force movement. Maximum effort should be made to integrate the capabilities of radars, unattended ground sensors, and night vision aids into the overall plan of ambush (fig 10-11). Radars may be used to accurately track and plot the location of ambush patrols. Radars may also be used to maintain surveillance over the ambush site prior to the arrival of the patrol, thus keeping the patrol from being ambushed. Unattended ground sensors with or without remote fire devices may be set up in close proximity to the ambush site to provide early warning and immediate reaction to sensor activations.

(4) *Tunnel monitoring.* Unattended ground sensors can be used in tunnel monitoring missions. Tunnels can be monitored at the entrance or from within, resulting in point target surveillance. Usually it is difficult to predict paths of movement by the enemy to and from the tunnel. When only a single sensor is employed, the number of personnel present in a tunnel is difficult to determine. However, the information that a tunnel is in use yields data of some value. It is possible that surface monitoring of underground routes can be accomplished, depending on the depth of the tunnel and the ability to determine directions and locations of the tunnel route.

c. Illumination. In conventional operations, each situation must be carefully considered with respect to the employment of illumination. In stability operations, artificial illumination may be employed when conducting early night operations. In the defense, searchlights with IR filters may be employed on the perimeter to detect enemy infiltrators and to verify sensor activations of UGS fields placed around the perimeter. In the defense, illumination flares light up the battle area and may also provide some light for operating image intensifying devices.

10-21. River-Crossing Operations

The purpose of a river crossing is to move the attacking force across a river obstacle as rapidly and efficiently as possible, so that it may either continue its attack to destroy the enemy or seize objectives that will protect the crossing of the force. The detailed doctrine and techniques of planning and executing tactical river-crossing operations are contained in FM 31-60. This paragraph supplements FM 31-60 by discussing the STANO devices which can be used by the crossing force in a river-crossing operation.

a. Time of Crossing. As river-crossing sites normally represent defile target zones, a crossing operation is best conducted and concealed from observation when it is carried out under cover of darkness or under conditions of reduced visibility such as smoke, fog, or rain. However, many factors influence whether a crossing is made in daylight or darkness. Such factors as the need for concealment, the state of training of the friendly forces, the nature of the terrain, the characteristics of the water obstacle, the enemy disposition and capabilities, and the need for speed are all considered. STANO devices, especially lights (blackout or infrared vehicle lights), may be used to expedite crossing operations when the assault forces have eliminated enemy small arms fire at the crossing site. A decision for either a day or night crossing also considers the means available to cross the maximum number of troops and the greatest amount of equipment in the shortest possible time. This is particularly important at night, as daylight may allow the enemy to observe and to cut off the bridgehead from the near shore.

(1) *Daylight crossing.* A daylight crossing normally is made when greater crossing speed is desired, when the friendly forces have air superiority, and when it is imperative to seize objectives on the far shore. Heavily wooded or rough terrain generally favors a daylight attack. Smoke is used for both concealment and deception.

(2) *Night crossing.*

(a) A night crossing normally is made when the element of surprise is desired. It is also desirable when friendly air superiority does not exist. Open terrain generally favors a night crossing.

(b) A night crossing usually begins under blackout conditions. The assault elements of the crossing force are equipped with night vision devices (e.g., electronic binoculars). These elements attempt to cross the water obstacle by stealth; however, the use of pink light for artificial illumination could conceivably be used when its use is carefully timed and tied into the overall deception plan so that the element of surprise is not lost. Assault elements cross during darkness and use morning twilight to seize and consolidate the first phase objectives and then if required expand the bridgehead during daylight. Amphibious units are used when available.

b. Crossing Means. Amphibious vehicles (M-113, M-114, and LARC) can cross during hours of darkness using night periscopes, IR searchlights and night crew-served weapon sights

for navigation. Boat crews can be issued handheld night vision devices. To preserve a far shore capability to operate at night, extreme care must be taken to prevent the loss of these night vision devices in the over-the-water assault. Members of boat teams, using handheld night vision devices to observe the landing site, should secure them with a strap or tent rope. Assault boats, rafts, ferries, and floating bridges are also provided.

c. Unattended Ground Sensors. When time permits, possible crossing and landing sites can be seeded with UGS. The commander, through monitoring these sensors, selects the site best suited for the particular mission. A limited security system would then be in operation prior to the arrival of the assault element. An alternate method would be to place a strobe light at the selected landing site to guide vehicles across the river. A security force would be needed to secure the crossing/landing sites prior to the assault elements. UGS, when employed should be placed well forward and on the flanks of the landing site to detect the possibility of an attack.

d. Searchlights. Eventual expansion of the bridgehead by the assault forces to the point where the crossing site is no longer vulnerable to enemy artillery fire may permit full use of searchlights or other artificial illumination to light the general area. Thus, construction of rafts and bridges is hastened and entry and exit points on the near and far shore can be lighted for safety to increase the speed of vehicles and personnel making the crossing.

10-22. Border Security/Anti-Infiltration Operations

Border security/anti-infiltration operations are conducted to isolate hostile elements from outside assistance or to prevent their buildup behind friendly lines. The detailed doctrine and techniques for planning and executing such operations are contained in FM 31-55.

a. Control and Intelligence.

(1) Control of STANO activities usually is more centralized for border security operations than for normal operations, and is also influenced by the fact that reaction forces normally are not available at the lowest echelons. Reaction in isolated areas normally is accomplished either by fire-power or by airlifted forces, thus requiring the most rapid transmission of STANO information to the level at which control of these elements is exercised. Reaction in manned systems areas is

influenced by the friendly population density and the fact that units manning the trace are strung out along wide frontages. Both of these factors require that reaction be tailored and controlled in a manner designed to insure the fastest possible receipt of information at the echelon controlling the reaction force. Coordination is also made with supporting Army Security Agency units as these elements can provide special and supplemental surveillance in these types of operations.

(2) UGS and radar developed data can be used to establish patterns of enemy activity. Use of appropriate sensor mixes enables traffic to be monitored over a variety of routes such as roads, waterways, ridgelines, and natural defiles. Sensors and radars can be used throughout a network of enemy infiltration routes in border areas to monitor enemy movement and develop information for use in planning offensive actions.

b. Materiel Considerations. STANO materiel used in border security operations supports two general types of border areas. Isolated areas, where low population density, long border frontage, and natural terrain barriers make the construction of manned systems unnecessary or infeasible; and areas where population density is high, the border is relatively short, well defined, and strategically important, and sufficient resources are available, all of which make establishment of manned systems feasible.

(1) The isolated area system relies heavily on the use of remote sensors placed along avenues of known or likely infiltration. These sensors are unattended, capable of being spread over relatively large areas, and are usually "read out" by means of aircraft. In addition to hand-emplaced unattended ground sensors, air delivered ground sensors (air delivered seismic intrusion detection—ADSID and acoustic-seismic detection transmission set—SPIKESID) are widely used to discover avenues of infiltration. Ground patrols or forward operating bases use light radars and night vision devices to provide surveillance over areas of infiltration.

(2) The manned systems use all appropriate STANO means to provide the greatest possible degree of surveillance. Particularly applicable to the manned system are devices which may be too heavy or difficult to emplace for normal tactical use, but which have a long life and are more reliable. Such devices include line sensors (e.g., balanced pressure sensors, infrared intrusion devices), the heavier radars, and illumination systems.

10-23. Patrols and Ambushes

The fundamentals of patrolling discussed in FM 21-75 are unchanged during periods of limited visibility. Operational techniques must be modified to take advantage of the concealment of darkness when planning and conducting patrols. Proper use of available night vision and surveillance devices provides a near daylight capability for the conduct of the night patrol. Night operational techniques discussed elsewhere in this manual are applicable to patrol activities. STANO devices can enhance patrol and ambush operations as outlined below—

a. Equipment. Night patrols can be equipped with night vision devices and small sensors such as the patrol seismic intrusion detector (PSID), augmented with radar or scout dogs, based upon the commander's evaluation of METT factors.

b. Passage of Lines.

(1) The departure and return of patrols through friendly lines, especially during periods of darkness, requires detailed planning, coordination, and precise execution.

(2) The passage of patrols through a friendly forward unit is conducted in a deliberate and thoroughly coordinated manner. Coordination with the forward unit is accomplished early in the patrol planning. This coordination establishes night recognition signals using metascope or starlight scopes, route(s) into and through the forward position, and passage point(s). When the patrol arrives in the forward unit area, a unit guide leads the patrol to an assembly area or initial rallying point (IRP). The patrol leader completes final coordination with the forward unit commander, to include any changes in recognition signals and friendly and enemy dispositions. Upon completion of final coordination, the patrol is guided to the passage point. Employing starlight scopes, a security party of the patrol observes the area forward of the frontline to the limit of the unit's final protective line (FPL). Simultaneously, the compass man prepares a night compass setting at the passage point. After the area is observed and determined to be clear of the enemy, the patrol leader orders the patrol guided forward to the passage point by the assistant patrol leader (APL). The APL counts each member of the patrol by touching each man on the shoulder to insure an accurate count. The patrol moves quickly and silently through the FPL zone without halting. A security halt is called after the patrol has cleared the FPL zone so patrol members can

adapt their night vision, adjust to night noises, and listen for sounds of the enemy. Employing night movement techniques, the patrol then moves to the objective by a predesignated route.

(3) Reentry through friendly forward positions is more hazardous than the departure. The patrol leader halts the patrol outside the FPL zone. A reconnaissance team probes the passage point (reentry point). This is the most critical period of the reentry because of the possibility of being mistaken for the enemy. The reconnaissance team moves with caution to avoid being fired on by outposts. Effective use of night viewing devices aids in locating and signalling the friendly forces. Once the reentry point is located and contact with the frontline is established by an exchange of recognition signals employing the metascope, the patrol moves through the reentry point. Each patrol member is identified and counted as he passes the reentry point. A guide from the frontline unit leads the patrol to an assembly area or the IRP. The patrol leader gives a spot report to the commander of the forward elements on the status of the patrol and passes on any information that is of immediate value to the frontline unit.

c. Movement at Night and Navigation. The employment of night vision devices and the coordinated use of artificial illumination facilitates the patrol's night movement. Active night vision devices are used as signals or beacons to assist in night navigation. Passive night vision devices such as the starlight scope provide sufficient observation capabilities to allow the patrol to orient on terrain features. Signalling small arms fire, artillery and mortar illumination, smoke grenades, radar, and searchlights may be used to assist in maintaining directional orientation. Ground surveillance radars and night observation devices can be used to vector patrols toward specific targets such as enemy personnel or terrain features. Night vision aids are not employed if there is a possibility that they may jeopardize the security of friendly elements.

d. Control. Patrols especially at night are difficult to control. Friendly surveillance radars may be used for navigation of night patrols. Infrared devices are used for visual control and signalling purposes. The increased vision capability provided by night vision aids generally reduces the control problem.

e. Reconnaissance. The night area reconnaissance requires the preparation of an operation plan for the use of night vision equipment, UGS, and radar. One method of reconnoitering an area

during hours of reduced visibility is to provide each man with a night vision device such as an infrared binocular or starlight scope. Battlefield illumination may be employed to light up the objective area after the patrol is in a concealed position. The patrol seismic intrusion detector (PSID) is an easily emplaced and excellent security means for night halts.

f. Ambushes.

(1) Night vision goggles, night observation devices, patrol seismic intrusion detectors (PSID), thermal viewers, crew-served weapon sights, radars, and starlight scopes can be used to survey the area surrounding the ambush site prior to establishing the ambush and then provides good observation of the approaches to the killing zone. Once the enemy has entered the killing zone, operators are able to place accurately aimed and effective fire on the enemy. Radar and UGS developed data can indicate patterns of enemy movements and hence assist in choosing favorable ambush sites.

(2) Remotely fired munitions may be used in combination with hand-emplaced sensors. Command-detonated mines can be emplaced to cover the kill zones, and when the sensors indicate the presence of a suitable target, the mines are detonated. When the sensors are emplaced with sufficient accuracy, artillery offers an ideal method of attacking the target.

(3) A plan for illuminating the ambush site after contact is made and is included in the patrol plan. Illuminating artillery and mortar fires, hand-held flares, or illuminating grenades can be used for this purpose.

g. Counterambushes.

(1) Such devices as stationary radars, unattended ground sensors and night vision aids may assist in counterambush tactics by maintaining constant surveillance over the route of march of the convoy or patrol and the areas of suspected enemy locations. Radars scanning a given area may overlap and support the devices already employed in the area and provide additional all-round security for friendly forces. Sensors along likely avenues of approach or withdrawal, aircraft with IR searchlights screening the surrounding area, and night vision devices mounted on trucks in a convoy may be employed in counterambush tactics. Different types of unattended ground sensors using varied techniques employed in a given area will give a better description of the target than employing only one type of sensor (i.e., magnetic, seismic or acoustic). Airborne per-

sonnel detectors may also be employed in detecting suspect enemy locations.

(2) Unattended ground sensors also assist in increasing the element of surprise by maintaining surveillance at such distances that the possibility of the enemy detecting the patrol is decreased.

(3) Unattended ground sensors and/or radars employed beyond the FEBA provide the combat commander with the capability to disrupt enemy assembly areas, routes of march, staging areas, convoys, etc., and assist in supporting harassing ambushes. Various types of STANO device employed together (such as seismic sensors and a night observation device) will assist in the location of an enemy target and increase the effectiveness of fires on the target.

10-24. Route and Convoy Security

a. Materiel Considerations. STANO materiel in route and convoy security is required to detect an enemy approach toward, or present at, critical points on the route (e.g., bridges, culverts, or other defiles) and to assist in the safe passage of the convoy. To accomplish this detection, unattended ground sensors are placed at probable ambush sites and along approaches to critical points and possible routes of withdrawal. Long term surveillance of frequently used routes is provided by use of sensors which are activated and deactivated upon command. Aerial sensors provide surveillance of areas adjacent to secured routes, and patrols or security-detachments use mounted or lightweight radars, night vision devices, and crew-served weapon sights to detect ambushes or enemy forces approaching secured routes. Airborne personnel detectors may also be used in the detection of concealed enemy personnel. SIGINT and ESM may provide special and supplemental intelligence for route and convoy security by assisting in the location of likely or probable ambush sites which are controlled remotely.

b. Control. Control of STANO assets supporting a route security or convoy security operation normally is exercised by the commander who also controls the reaction to the enemy threat. This may range from a convoy commander who controls the security detachment for the convoy to a higher commander who controls fire support and ground reaction forces supporting route security operations within a large area. STANO information reporting procedures are established in a manner which allows the most rapid receipt of information at the command which controls reactions.

10-25. Countermine Operations

a. General. Mines and boobytraps are a major tactical threat in limited wars, cold wars and, in particular, stability operations. The notable effectiveness of nonstandard, hand-emplaced mines by an insurgent guerrilla force is a threat that STANO devices may be used to counter. The application of STANO in the execution of countermine combat functions is a key element in the "total resources" or integrated approach to countermine operations. STANO will support all the interrelated elements of integrated countermine warfare which include:

(1) *Intelligence.* All STANO resources can be used to gather data on enemy minelaying operations. This information, when analyzed, will pinpoint specific areas or operations which warrant closer scrutiny or focusing of surveillance activities.

(2) *Surveillance.* Identified areas of suspected and likely minelaying operations will be placed under close surveillance by unattended ground sensors, airborne and ground radar, and night vision devices. The information gathered will be subjected to a detailed analysis of the minelaying capabilities and operations of enemy forces.

(3) *Analysis.* The comprehensive evaluation of information gathered by all STANO resources, including those STANO resources primarily dedicated to identifying enemy mine operations will be performed by the G2/S2 and G3/S3 staff elements.

(4) *Denial.* STANO devices are employed in conjunction with other means both to measure effectiveness of denial means and to determine when entry into an area is occurring or about to occur. If, during incursion into a given area, an enemy force emplaces his own mines or friendly forces encounter enemy mines, the classical task of detection is required.

(5) *Detection.* The detection operation, which in the past has ranged from use of probes to use of electronic/magnetic sensors, can be greatly enhanced or supplemented with STANO hardware.

(6) *Neutralization.* The laborious task of breaching, clearing, and neutralizing located minefields is best conducted under optimum light conditions. This is seldom tactically feasible. The use of night vision devices to assist clearing parties working at night will improve the speed and efficiency and reduce the tactical risk of this operation.

The use of sensors or small emitters to mark detected mines or minefields for follow-on neutralization operations will also be a major aid to clearance. The STANO hardware used as markers will also enable tactical units to safely negotiate cleared lanes or to avoid uncleared minefields.

b. Use of STANO Equipment. There is a variety of STANO equipment available for employment in countermine and counter boobytrap operations. STANO equipment can be effectively used in:

(1) *The detection of enemy personnel actually emplacing mines and boobytraps.*

(a) *Unattended ground sensors.*

1. Seismic, acoustic, electromagnetic, magnetic and balanced pressure unattended ground sensors provide a valuable means of detecting enemy personnel and equipment. These sensors may be effectively emplaced to monitor areas likely to be mined or boobytrapped by the enemy. Use of UGS to maintain surveillance of frequently used routes, lines of communication, pipelines and main supply routes (MSR) can significantly effect the enemy's capabilities to employ mines and boobytraps to interdict supply routes or to restrict movement in and out of base areas. UGS employment in this application can reduce the commander's requirement for time consuming route clearing operations prior to movement.

2. For most effective indirect fire support, hand-emplacement of the sensors is the most desirable, since this method offers the highest degree of location accuracy. A combination of various types of sensors can be installed in an arrangement tailored to the terrain, vegetation, soil composition, and tactical situation.

3. Data is collected at sensor monitor receivers. These monitor stations may be ground-based or airborne. Data is analyzed on a near realtime basis at the monitor stations and used for both immediate targeting and long term data collection. When used for immediate targeting, the monitor should be so located that near real time data can be analyzed by the fire support coordinator or by the fire direction center. Effectiveness of this type of surveillance depends on the ability to accurately locate the sensors, to interpret the sensor information quickly and correctly, and to take appropriate action based on the information.

(b) *Radar.* Radars may be employed from an observation post with direct communications provided to the unit command post. Radar detec-

tions would confirm the presence of enemy personnel engaged in mine and boobytrap emplacement in areas covered by the radar. When determination is made of enemy activity in an area, pre-planned fire missions may be called or maneuver units having the mission to deny the area to the enemy may be alerted and take corrective action.

(c) *Night vision devices.* Night vision devices (both active and passive) may be effectively employed in monitoring areas susceptible to mine and boobytrap emplacement by the enemy during the hours of darkness or periods of reduced visibility. Night vision devices may be employed along the FEBA and under the control of a listening post or observation post, which in turn has direct communication with the unit command post. Fire or maneuver elements are employed when enemy presence is confirmed as described in b above.

(2) *The location of mines and boobytraps emplaced by enemy personnel.* Once emplaced, enemy mines and boobytraps must be located and neutralized. STANO devices used in mine detection are based on the principle of thermal imagery. Thermal detection of mines is possible because objects buried in the earth generally differ in temperature from the surrounding earth. As the sun sets, the earth's surface begins to cool. Since the thermal conductivity of buried objects is generally higher than the earth's, the object will cool more rapidly. Thus, at night the temperature of a buried object will be lower than that of the surrounding earth and consequently the earth directly above the object will be lower in temperature. (The opposite conditions hold during the day.) The three STANO devices operating on this principle and presently used for mine detection when favorable environmental conditions exist

are the infrared viewer (AN/PAS-7), commonly known as the handheld thermal viewer (HTV), the night vision system (AN/AAQ-5), commonly known as the forward looking infrared (FLIR) sensor, and the (AN/VAS-1) far infrared target indicator (FIRTI).

(3) *Clearing or breaching minefields at night.* During night operations, areas suspected of containing enemy mines or boobytraps are flooded with high intensity infrared light from the searchlights of accompanying tanks, CEV, or 1/4-ton searchlight equipped vehicles. Using this infrared light source, personnel charged with neutralizing the mines or boobytraps or breaching the minefields are equipped with electronic binoculars and using mine probes, handheld thermal viewers, and metasopes, they proceed to neutralize the enemy mines and boobytraps.

10-26. Tactical Cover and Deception, Raids, Feints, Demonstrations and Ruses

Tactical cover and deception operations are undertaken to cause the enemy to derive and accept a particular predetermined estimate of friendly dispositions, capabilities, and intentions so that he will react in a specific, predicted manner that is disadvantageous to enemy forces and advantageous to friendly forces. Detailed information on tactical cover and deception measures and planning is contained in FM 31-40. Active STANO devices which transmit electrical or IR signature must be coordinated with the electronic warfare phase of such operations. (See chapter 8 on signal intelligence and electronic warfare.) Consideration must be given to the effect of the presence, absence, increase of STANO systems in a given area.

Section VI. REAR AREA SECURITY

10-27. General

Particular emphasis is placed on rear area security by commanders at all echelons since the enemy may strike from any direction. Rear area security may be defined as those measures taken to neutralize or destroy localized enemy forces which constitute threats to units, activities, and installations in the rear. Security plans include use of STANO devices so that a more effective warning system is provided for early identification of the threat. The use of these devices enables the commander to provide effective rear area security with minimum forces.

10-28. Employment of STANO Devices

a. When establishing observation posts and barriers throughout the rear area to detect enemy forces, the following STANO devices can be used (fig 10-12).

(1) Lightweight radars and night vision devices can assist visual OP during periods of reduced visibility.

(2) UGS can also provide a suitable means for remote monitoring of several trails from a single location by placing sensors along the routes of approach.

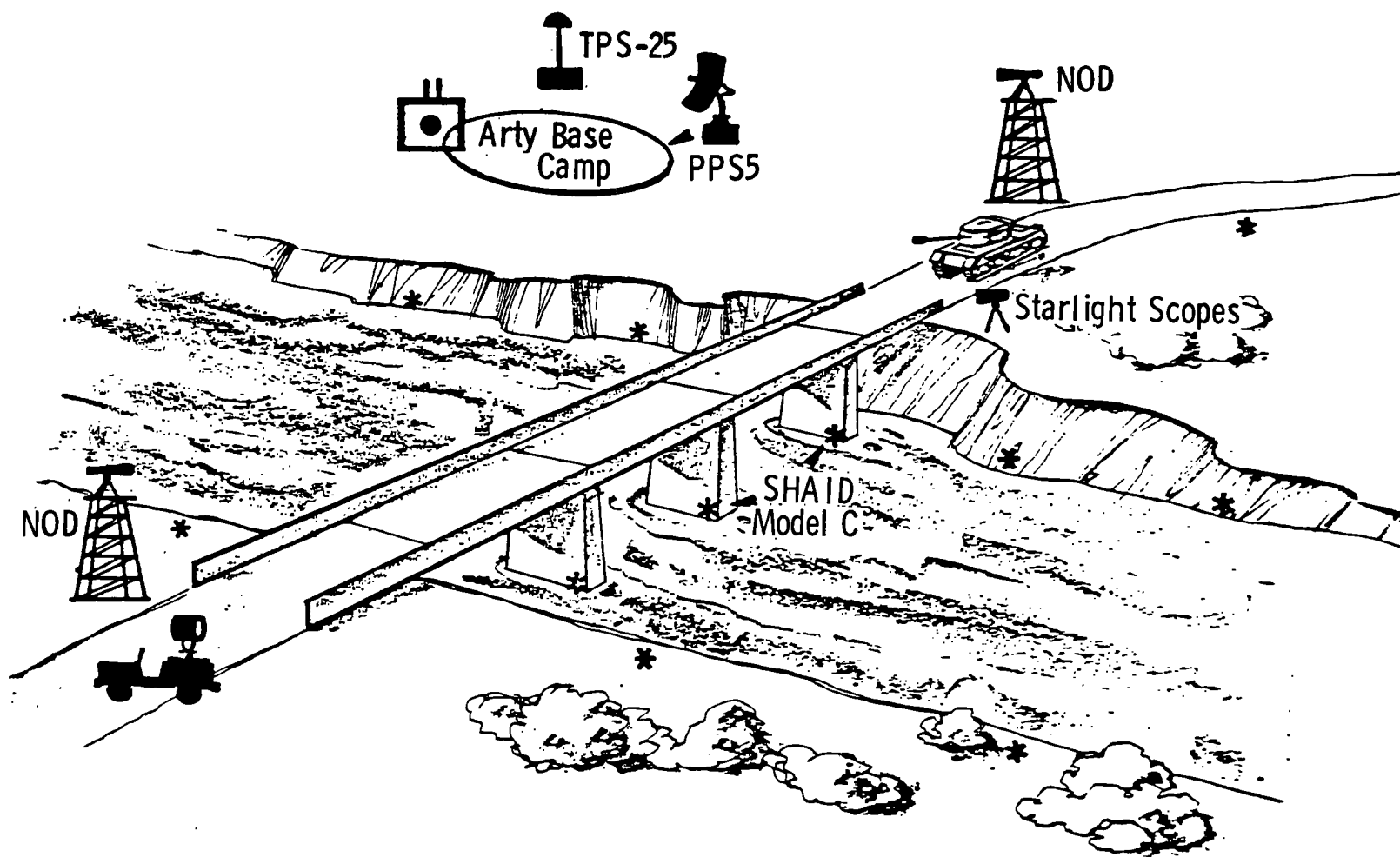


Figure 10-12. Rear area security.

b. Other methods of using STANO devices in rear area security are—

(1) Skillful emplacement of acoustic and/or seismic UGS devices in the vicinity of probable landing zones or drop zones to provide the ground commander with timely early warning of enemy activity. The commander can use this information to gain a tactical advantage and possible reduction or elimination of friendly casualties.

(2) The emplacement of UGS around logistic storage areas, prisoner facilities, command posts, munition storage areas, and radio relay sites provides a significant economy-of-force capability to commanders.

c. Successful defense of the rear area is contingent upon the early warning furnished by security elements deployed throughout the area. With the use of sensors and night observation devices, early warning of the enemy's presence is provided.

d. Employment of airborne STANO systems provides the commander with another reconnais-

sance, surveillance, and target acquisition means. Combat intelligence is derived by employing these airborne systems along known infiltration routes and avenues of approach. Employment of such systems as the SMASH and CONFICS provides a systematic and repeated watch over these areas for the purpose of detecting, identifying, locating, and reporting any information of military value, for the purpose of target analysis and the possible engagement of targets by on board weapons systems. In addition, they are targeted against likely assembly areas, cache sites, and known enemy locations. Mission assignments are made by brigades, division artillery, or division considering current intelligence and the availability of other surveillance assets.

e. Use is made of the XM3-airborne personnel detector (APD), supplemented by normal visual reconnaissance and airborne gunships as appropriate.

f. Use is made of the integrated observation system (IOS) on key terrain features, especially in combination with radars and sensors.

Section VII. DEFENSE OF FIXED INSTALLATIONS

10-29. General

The defense of fixed installations is a perimeter defense as discussed in FM 31-16, FM 31-81, FM 31-85, and appropriate field manuals of the 100-, 7-, and 17-series. The tactics and techniques of night operations as described throughout this manual are also applicable.

10-30. Techniques of STANO Employment in Base Defense Missions

a. *Proper Use of Terrain.* Consideration is given to the collocation of security elements and surveillance equipment to maximize the effectiveness of available STANO devices. Night observation posts should be positioned to make maximum use of passive and active night vision equipment. Ground surveillance and countermortar radars should have high priority for position areas.

b. *Security.* Early warning provides the time required to react to a hostile threat. Techniques to provide sufficient early warning include the use of unattended ground sensors, outposts, observation posts, patrols, ground surveillance and countermortar radars, anti-intrusion devices, and aerial surveillance. Foliage penetration radars can be used to supplement other radars for close-in secu-

rity in areas of dense growth. Airborne personnel detectors may be employed to detect enemy personnel concealed in areas of defense foliage. Sentry dog teams are an effective security measure, especially during periods of darkness. Sentry dogs offset many of the limitations of unaided night vision and can complement many STANO devices. The presence of sentry dogs provides psychological advantages and act as a deterrent to would be infiltrators.

c. *Mutual Support.* Requirements for mutual support must consider the circular aspects of the defensive area. Unattended ground sensors, night observation devices, surveillance radars and anti-intrusion devices are employed to cover gaps and to supplement coverage on principal enemy avenues of approach. Gaps are controlled by effectively employing the following STANO devices in the base defense systems:

(1) Close-in perimeter defense using PPS-5 or PPS-14 radars, xenon searchlights, and NOD to complement the system.

(2) Combined use of multi-purpose concealed intrusion detector (MCID), infrared intrusion detector (IID), and balance pressure systems (BPS) to gauge sensitivity and activity on an area. Illumination devices such as trip flares,

flame expedient, searchlights and artillery (mortar) illumination are employed to expose or harass the enemy. Care is taken to insure that friendly positions are not exposed.

d. All-Round Defense. Surveillance and counter-mortar radars are positioned to establish maximum all-round coverage. Searchlights (visible and IR), thermal viewers, medium range NOD, starlight scopes, crew-served weapon sights, and ground surveillance radars should be positioned around the perimeters. Line and RF sensors can be emplaced forward of and between protective wire obstacles. No one section of the perimeter should be dependent upon a single surveillance means. All available equipment should be positioned to facilitate overlapping coverage and to permit one system to verify targets acquired by other means. The NOD medium range and thermal viewer are most effective when mounted in towers along the perimeter. Sensors can be placed in used or suspected enemy rocket or mortar firing sites to warn of impending attacks prior to the firing of hostile weapons. Artillery can be adjusted by means of night observation devices, searchlights or firing on predetermined registration points.

e. Responsiveness. Responsiveness during periods of reduced visibility depends largely upon the ability of the reserve force to operate at near daylight capability. Flexibility is obtained by employment of battlefield illumination means and night vision aids. Such STANO devices offer the

defender a significant advantage in that they may provide early warning in the event of attack and the ability to place effective direct and indirect fire upon the enemy in defense of the installation. Control of STANO activities normally is centralized at the level which controls the reaction effort to disrupt or prevent the attack against the installation. This centralized control is most commonly found at the installation commander level and normally is in the form of control of the internal reaction to the threat, although higher echelons may control the supporting fires. STANO activities are organized to provide the most rapid possible transmission of STANO information to the level at which reaction is controlled. In flat terrain, radars are very effective in confirming findings developed by UGS and in maintaining contact with enemy forces until artillery can be brought to bear on the target.

f. Dispersion. Although dispersion is difficult to maintain in base defense, this problem is partially overcome by using STANO equipment in a defensive role well forward of the actual base area. Night observation devices and radars should be adequately camouflaged or concealed when not in use to avoid revealing valuable intelligence information to the enemy. Consideration should be given to relocating any piece of STANO equipment, within reasonable limits, any number of times, and setting up dummy positions to avoid detection by enemy personnel (especially in a limited warfare or stability operation).



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CHAPTER 11

STANO HUMAN FACTORS

SECTION I. INTRODUCTION

11-1. General

Human factors and human engineering considerations have been recognized in the design, development, and testing of STANO equipment. Of major concern are the human performance problems associated with night observation, especially the capability for continuous operations. Effective operation of STANO devices and systems is highly contingent upon such human behavioral factors as the user's ability to understand the design characteristics and functioning of the equipment and to generate the required information output. This requires that appropriate personnel be selected, operating procedures be defined and that personnel be adequately trained. Selection of personnel rests on the identification of those individuals who possess the combination of relevant physical and mental skills necessary for best performance. Experience and techniques of operation can be imparted through training and enhanced through practice. This chapter presents principles and techniques which will enhance operator performance and define conditions for the most effective use of operator personnel.

11-2. Operator Training and Selection

The unit commander is responsible for identifying those men who make the best operators of the devices with which his unit is equipped. Since the identification of the more proficient operators of any device depends upon observing the man as he uses the equipment, the discussion which follows considers training first followed by selection.

a. Operator Training. Operator acceptance of any piece of equipment and his willingness to use it will be largely dependent upon his ability to use it successfully without undue discomfort. Experiments conducted with light intensification STANO equipments used in a ground role have shown that training should be conducted on an individual basis and can generally be accom-

plished in about 90 minutes. Longer training time is required for the airborne systems. Training should include the following: Device familiarization and instruction in search techniques; familiarization with the physical appearance of targets viewed through a night vision device, and practice in target acquisition using proper search techniques.

(1) *Device familiarization.* For each device, the operator must be instructed in the mechanical, operational, and maintenance aspects of the equipment. Instruction is necessary on positioning the equipment to provide the desired field of view.

(2) *Instruction on search procedures.* Search techniques established as best for each piece of STANO equipment should be provided to the operators. This may vary from one piece of equipment to another.

(3) *Recognition of target signatures.* Each operator must be instructed in display characteristics peculiar to the STANO device he will use that will allow him to differentiate targets from nontargets. Graphical, photographic, and auditory aids can be devised showing both true target signatures and common misinterpretations. The type of aid devised will depend upon the device used. Operator familiarization utilizing these aids should greatly reduce errors of misinterpretation.

(4) *Reporting procedures.* The operator should be instructed in the proper method to be used in reporting observations. Reports may be given directly to the user by radio, by phone or in writing. Timeliness and accuracy are the most important criteria to be observed when reporting. The operator should, however, report fragmentary information when that is all that is presented to him. The completeness and accuracy of a report may vary from one situation to another. The need must be established by the commander. In no event should the decision as to what is reported be determined by the operator.

(5) *Feedback during training.* It is abso-

lutely essential to keep the soldier informed as to how he is progressing during training. If this precaution is ignored, he may be constantly trying out different techniques or may settle on a poor technique. Proper use of feedback requires that the soldier be told that he is right whenever his performance is correct and that he is wrong whenever he is in error. For error responses he should be told what is the correct response.

b. Operator Selection. The identification of those men with superior skill in handling and exploiting each STANO device can be accomplished by following the steps outlined below:

(1) *Establish a test course.* In a rear area where the terrain conditions represent the anticipated operational situation, locate positions where targets such as personnel, vehicles, and so forth can be sited. Realistic type training of this nature will enhance the soldier's ability to provide the commander with knowledge of what is actually located on the ground. Different test courses may be required for different devices.

(2) *Development of test situation.* A standard test situation should be prepared and written out so that the same instructions can be given verbatim to each successive participant. (Reliance upon memory for these instructions should be avoided.) This situation should specify the man's task, i.e., prescribe what he is to do and how he is to make his report.

(3) *Establish performance criterion.* Prior to conducting the performance test, the unit commander must establish the method he will use to

rate the operator's performance. Many different aspects may be of importance in the employment of a device under different operational circumstances. For example, failure to report a target when the operator is uncertain of his detection may be much more damaging than reporting many false targets or vice versa. In any case the desired level of performance should be established before testing the operator. A simple way for scoring accuracy is to take the ratio of correct to total responses. Completeness can be measured simply in terms of number of targets correctly detected.

(4) *Evaluating performance.* The performance of each operator can be measured in terms of the established criteria and the men rated from best to poorest. If general operator performance is poor on some aspect of the test, the training program may have to be improved.

(5) *Recording test results.* The administrative procedure of recording the results of the field testing must not be overlooked. The establishment and maintenance of a skill inventory for each man should be made a standard procedure, whenever possible. If training is given in a garrison environment, the personnel clerk might be tasked with comparing the results of these field tests with the standard test records on the Army Classification Battery (ACB). If a consistent relationship between field test results and certain ACB tests were to become apparent then performance on these ACB tests could be used as a screening device for the selection of potential operators for a designated STANO device.

Section II. NIGHT VISION DEVICES, GROUND

11-3. General

Typical ground night vision devices are night vision sights: crew served weapons sight—AN/TVS-2, night vision sight, individual served weapon (starlight scope)—AN/PVS-2, and the night observation device, medium range—AN/TVS-4. These devices can be operated by a single individual after a minimum period of training.

11-4. Training

Training for these devices must cover device familiarization, instruction on search procedures, the physical appearance of targets, and target reporting procedures.

a. Device Familiarization. Device familiarization should include instruction in proper diopter

and focusing techniques. The differences in the purpose of the diopter and focus adjustments must be emphasized—diopter adjustment being the setting of the device to the requirements of the individual operator's eye, and focus being the adjustment for distance to maximize sharpness of image. If proper diopter adjustment is not made, operators will miss potential targets and, further, may become ill with headaches, nausea, and dizziness. The diopter adjustment procedure is simple but must be strictly followed.

b. Instruction on Search Procedures. The untrained operator will typically fail to cover portions of the terrain, will cover them too rapidly, or will spend excessive amounts of time examining some areas to the exclusion of others. Typically, also, the operator will fail to detect some 50

percent, or more, of the targets that he can see with his device. The elements that must be communicated during training are the need for comprehensive search, and the adjustment of the speed of search. For convenience of reference, a distinction is made among "instrument scan", "eye scan", and "search." Instrument scan refers to movement of the device in order to direct it toward different portions of the terrain; eye scan refers to the examination or scrutiny of the image display; search is the general term referring to the entire instrument-scan, eye-scan process.

(1) *Comprehensive search.* The first requirement for target detection is that the operator look at the portion of the terrain in which a target is likely to be located. In order to prevent accidental exclusion of portions of the terrain, a regular pattern of instrument scan should be used. On terrain with no elevation changes, it may be possible to see all portions of the search area with a single lateral movement of the device. On more hilly terrain, several lateral and vertical movements may be required. The nature of the instrument scan pattern is of little importance as long as it is comprehensive and regularly followed.

(2) *Adjustment of speed of search.* As targets in combat frequently are exposed only for short periods of time, rapid search is essential. A device operator may fear that he has not detected an enemy who is approaching his position. Both of these factors tend to produce very rapid instrument scanning of an area. However, when a target is "captured" in the device field of view, the display must be examined for some period of time if the target is to be detected, that is discriminated from other objects in the display. Initially in training the search procedure will be slow and methodical. As operator competence improves, his scan pattern will be rapid and he will cover the terrain more effectively. Efficient search involves a tradeoff of these two factors: Rapid instrument scan and adequate eye scan or examination time. The nature of the tradeoff is determined by the capabilities and limitations of the particular devices used, as they interact with a number of external factors, including light, terrain, size of search area (field of view), and characteristics of the target. As an average figure (in the early stages of training), instrument scan should be slow enough to hold a target in the field of view of the device for 6 to 8 seconds. Target areas should be searched slowly with the near-area searched first.

(3) *Light.* With good lighting conditions—ei-

ther natural or artificial illumination—the time required for eye scan for night vision and optical devices is minimized and, correspondingly, instrument scanning can be performed more rapidly. As the light decreases, more lengthy eye scan is necessary, and the rate of instrument scanning should correspondingly decrease.

(4) *Terrain.* In open terrain, the time required for eye scan is relatively small and instrument scan can be rapid. As terrain clutter increases, the amount of eye scan should increase, and the rate of instrument scan should correspondingly decrease.

(5) *Size of search area.* As the size of search area increases, adequate coverage necessitates rapid instrument scan and little eye scan time. The requirement for rapid search of a large area may therefore exceed the individual's ability to examine adequately the image display, with a resulting drop in probability of target detection. No guidelines can be provided for size of search area as this will be a function of such other factors as the mission, light, and terrain. The size of search area must therefore be determined, based upon previous experience in similar situations.

(6) *Nature of target.* Obviously, large targets are more easily detected than small targets. However, target detection difficulty is also affected by the similarity of the target to other objects in the terrain. For example, a kneeling man would be very hard to detect in terrain covered with tree stumps. Search, therefore, should be adjusted according to the characteristics of the targets expected, as well as to the nature of the terrain involved.

c. Familiarization With the Physical Appearance of Targets Viewed Through STANO Devices. The appearance of targets seen through these devices is not identical to their normal appearance during daylight. This is particularly true under low illumination when the target appears very fuzzy and indistinct and device sparkling is pronounced. Operators should be given the opportunity to become familiar with the appearance of typical targets under various conditions and at various distances. This can be done by placing targets in a suitable terrain, pinpointing their location for the device operators, and then having the operators study each target for one or two minutes.

d. Practice in Target Acquisition Using Proper Search Techniques. After previous training, typical targets should be placed in suitable terrain

and operators should be given practice in searching for targets using the appropriate device adjustment and search procedures. Individual performance should be carefully monitored to correct improper use.

e. Target Reporting. See paragraph 1-2a(4).

11-5. Employment of Devices

Employment of these STANO devices is concerned with the appropriate work/rest cycle and such operational factors as capability and deployment.

a. Work/Rest Cycle. In most cases, operators are capable of using the devices almost continuously for at least 6 hours without illness or degradation in performance when short (5-15 minutes) rest breaks are given every 30 minutes. If two men with one device are used as a team, alternation every 30 minutes between men on the device would be appropriate. When necessary, an operator can use the device without impairment of performance after 36-48 hours of continuous military activity without scheduled sleep. If a man using the device for prolonged periods of time complains of symptoms such as eye strain, headache, and nausea, he is probably using an incorrect diopter setting. He can remedy this situation by following correct diopter adjustment procedures. As the soldier is capable of continuous device use and as there is an equal probability of targets appearing during rest and search periods, target detection will be considerably enhanced if the device is used continuously.

b. Operational Employment.

(1) *Capabilities.* The device capabilities are greatly affected by such factors as level of illumination, nature of terrain (open, semicluttered, heavily cluttered with trees, brush, rocks, etc.), and size of search area, as well as by target characteristics such as size, distance, and movement.

(2) *Techniques of employment and mix.* When possible, it is desirable to assign two or more operators to search the same area. When two operators rather than one is used, the percentage of targets detected can be increased by about 50 percent under low light conditions and by about 25 percent under high light conditions. Under high light conditions, the use of multiple operators also results in more rapid detection of targets. When three operators are used, more tar-

gets will be detected but the gain is relatively small, particularly under high light conditions. As a rule of thumb, therefore, the probability of target detection will not be greatly increased when more than three operators with devices are used under low light conditions, or more than two operators under high light conditions, even when the area to be searched is large (750 by 1500 meters). When more than one device is used, all operators should simultaneously search the same area. Subdividing the total area to be searched into smaller subsectors should be avoided. The advantage of overlapping increases with an increase in the number of operators using this technique. Under some conditions, the performance of only two men using overlapping search of a 75° area is superior to the total performance of three men using 25° nonoverlapping subsectors.

(3) *Battlefield illumination.* Small increases in illumination greatly improve performance with these devices when the overall level of illumination is low. Increases in illumination beyond that provided by a half moon produce only slight improvement in performance. Consideration should be given, therefore, to the use of battlefield illumination under conditions in which the ambient illumination is extremely low. If indirect illumination can be used to increase light level from that of starlight to something approximating that of half moon, the probability of detection can be expected to increase on the order of 50 percent to 100 percent. Use of direct illumination of the narrow or coherent (laser) type will improve the capability for recognition and identification of targets. However, search will be made more difficult because of reduction in effective field of view. Pyrotechnic illumination should not be used in close proximity to these devices, as the high intensity light will cause the device to "blossom" and temporarily blind the operator.

(4) *Dark adaptation.* Use of light intensification devices results in loss of dark adaptation in the active eye(s). After use of a monocular device, the operator will retain dark adaptation in his inactive eye. Initially, this will produce a feeling of disorientation in the operator but this feeling is lost after some experience with the devices. Upon cessation of the use of a device, substantial recovery of dark adaptation in the active eye takes place within 3 minutes after starlight illumination, and almost immediately under full moon illumination.

Section III. NIGHT VISION, INFRARED

11-6. General

Typical infrared night vision devices are the electronic binocular, AN/PAS-5; metascope, AN/PAS-6 and thermal viewers, AN/PAS-7, and AN/PAS-10. These devices are best operated by an individual, and require 4-6 hours of training.

11-7. Work/Rest Cycle

When an infrared device is used in a search role, a minimum of two operators working as a team should alternate in its use every 10 minutes. This application must also be considered when these devices are used in a mine detection role in order not to unnecessarily slow down the forward movement of Army elements to the rear. This technique

reduces eye strain and conserves battery power. Approximately 30 minutes is the maximum time these viewers can be used continuously before eye strain becomes a serious problem.

11-8. Operational Employment

The general techniques discussed in paragraph 11-5b(1) through (3) also apply to thermal imaging devices. Similar to the night intensification devices described in Section II, infrared devices are also affected by such factors as the nature of the terrain (open, semicluttered, heavily cluttered with trees, brush, rocks, etc.), size of search area, as well as by characteristics such as size, distance, and movement.

Section IV. GROUND SURVEILLANCE RADARS

11-9. General

Current ground surveillance radars (GSR) include the radar sets, AN/PPS-5, AN/PPS-9, AN/PPS-14 and AN/TPS-25. Radar crews vary from one to three personnel. Considerable training is required to develop operator proficiency.

11-10. Work/Rest Cycle

In most cases, operators cannot watch the radar oscilloscope display for longer than 20 to 30 minutes because of eye strain and fatigue. A longer period of operation, from 40 to 50 minutes is possible if the radar is equipped with an alarm device. Efficiency can be increased if two operators are used on an alternating basis.

11-11. Operational Employment

a. Capabilities. Radar capabilities are greatly affected by such factors as nature of terrain (open, semicluttered, heavily cluttered with trees, brush, rocks, etc.); size of search area; target characteristics (such as size, distance, and movement)

as well as enemy electronic countermeasures.

b. Techniques of Employment.

(1) If the GSR has several beams of varying widths, the wider ones normally should be used for searching because of their greater area of coverage. Once a detection is made, the operator should attempt to switch to a narrower beam width in order to attempt to obtain a more accurate azimuth determination. If the precise location of target within a wide beam is not known, it may be necessary to sweep with the narrow beam several times in order to search the suspected area. Use of this technique may not be desirable if the target is moving rapidly or if too much time will be lost when switching from one beam to another.

(2) When more than one radar is used, each operator should be given an assigned area that overlaps adjoining radars. Ideally, the loss of one radar should not create a coverage gap. Radar coverage should be supplemented and coordinated with the use of other STANO devices.

Section V. AIRBORNE SYSTEMS

11-12. General

a. Types. There are two types of airborne STANO systems: Those designed for surveillance, fire control and navigation and those designed for collecting reconnaissance or surveillance data for use in developing intelligence. Airborne STANO

systems for surveillance, fire control, and navigation are used in rotary-wing aircraft and include such systems as the image intensifier system, night vision (AN/ASQ-132) (INFANT), forward looking infrared (FLIR) AN/AAQ-5, and the Cobra (AH-1G) night fire control system

(CONFICS). Airborne STANO systems for collecting reconnaissance and surveillance data are flown in the OV-1 (Mohawk) fixed-wing aircraft and include panoramic camera (KA-60C); serial frame camera (KA-76A); infrared surveillance system (AN/AAS-24); and side looking radar (SLAR) System (AN/APS-94D).

b. Principles.

(1) The general principles and techniques for use of STANO equipment presented in section I usually apply to aerial use of STANO equipment. The rapid movement over the ground which characterizes aerial use requires careful consideration of all the general factors previously mentioned, plus additional factors peculiar to aerial use. Low level flight presents an especially difficult situation. Factors which must be considered in aerial use of STANO equipment include:

- (a) Knowledge of target location.
- (b) Ability to determine aircraft position.
- (c) Target masking.
- (d) Where and how target will break out from masking.
- (e) Search field of view.
- (f) Recognition field of view.
- (g) Azimuth/elevation orientation of sensor.
- (h) Aircraft speed.
- (i) Aircraft terrain clearance.
- (j) Sensor slewing limits in azimuth/elevation.
- (k) Image blur.
- (l) Target size required for detection/recognition.
- (m) Purpose of STANO-derived information.
- (n) Gain/contrast/focus adjustments.

(2) The techniques chosen for a specific mission should be fully understood by all crew members comprising the mission team. When narrow field of view sensors (30 degrees or less) are used, crew coordination requirements for effective employment of STANO equipments are particularly demanding. Each aspect of the prescribed technique should be made explicit during mission briefings, with any changes promptly coordinated with other crew/mission members. If an integrated panoramic STANO sensor/display is available for the pilot, a large part of the verbal coordination can be eliminated due to the pilot being able to directly "see" much of his essential information. Even with such systems employment techniques will require extensive coordination.

11-13. Aircraft Employment

When aerial STANO equipment is employed, proper employment techniques must always consider both the aircraft and the peculiar aspects of the STANO system. The STANO equipment employment procedures should take the form of an SOP. The purpose of such an SOP is to quickly and clearly communicate to all personnel involved the intended employment techniques and any changes which are made as the situation develops. The STANO employment SOP should include the following information:

a. Aircraft Control.

- (1) Mission.
- (2) Aircraft heading.
- (3) Terrain clearance altitude and mission above-ground level (AGL).
- (4) Flight route to be followed.
- (5) Flight patterns for detection, tracking, attack.
- (6) Type targets of interest.
- (7) Expected target location(s).
- (8) Evasive procedures/actions.
- (9) Orientation to other mission aircraft.

b. STANO Device.

- (1) Sensor azimuth and elevation orientation to aircraft axis.
- (2) Field of view.
- (3) Suspect target inspection slew limits.
- (4) Reporting of suspect and positive targets.
- (a) Type.
- (b) Number.
- (c) Bearing/range.
- (d) Aircraft position.
- (e) Time.
- (5) Target contrast improvement vs. masking and clutter.
- (a) Filters.
- (b) Display contrast enhancement.
- (c) Trim of automatic gain control (AGC).
- (d) Threshold selection.
- (6) Known target surrounding area characteristics.
- (7) Known target bearing/range from reference points.
- (8) Target image dropoff procedures.
- (9) Rules of engagement for systems having on-board armament.

11-14. Fire Control and Navigation Systems

Fire control systems such as those mentioned in the previous paragraph present a rapidly-moving picture of the terrain below, either directly or in the form of a TV-like presentation.

a. Observer Performance. The primary factors affecting the observer are high image movement rates and masking. In addition to detecting a target, the observer must identify it before deciding that it represents a target of opportunity. Observer performance is influenced by the speed of the aircraft, altitude (AGL), and field of view of the observation device. These variables interact to determine the time the observer has available for viewing. A combination of relatively high aircraft speed and low altitude will mean that the observer has little time to view the display; under such conditions it may be expected that an observer will perform poorly, i.e., he will miss numerous significant targets. Under more favorable conditions observer performance will improve. Rapid image display rates limit the time available for image scan, and consequently reduce the probability of detecting targets or other information. It becomes necessary to reduce image movement rates by one means or another, or to increase target contrast. Tests have shown that most targets are detected on airborne STANO device images just before they drop off the lower edge of the screen.

b. Field of View. The probability of finding a target is directly related to the field of view used—the wider the field of view the greater the chance of finding a target. The amount of target area covered for a fixed field of view is directly related to the altitude of the aircraft. Since navigation errors virtually preclude any chance of finding a checkpoint at low levels, extremely wide fields of view are desirable for finding checkpoints

(almost always the checkpoint will be seen off to the right or left as it breaks out from behind masking). At nap-of-the-earth levels, even panoramic “fisheye” fields of view produce some image blur of points closest to the aircraft. If the line-of-sight is depressed well below the horizon, the entire image may be movement-blurred. With narrow fields of view, aircraft vibrations or maneuvers may produce some image blur. If stabilization circuits become inoperative so that excessive blur exists, selection of a wider field of view may result in an acceptable image.

c. Searching. When searching for a target whose location is approximately known, the field of view should be adjusted so that it just brackets the suspect area. If a field of view less than this area must be used to resolve the target, the features defining the limits of the suspect area must be noted and the suspect area must be scanned fully. A search for known location targets can be made by “walking” into the target area by use of a series of large, high contrast reference points. This is done by locating the large, high contrast features within the area in which the desired target is positioned. If the target location is precisely known, the area patterns can be used to “see” the location of the target before it can actually be seen on the imagery.

d. Foliage. Penetrating through moderate to dense foliage presents a severe challenge to airborne target detection and acquisition. Targets may be on the ground under the shadows of the trees. In this situation, automatic gain controls will be largely set by the high reflection off the tops of trees, while optimum target contrast in the shadows under the trees requires a different setting. AGC trim, if available, should be set to provide optimum target contrast when this situation exists.

Section VI. READOUT SYSTEMS FOR UNATTENDED GROUND SENSORS

11-15. General

Typical items of display equipment that provide an integrated readout for a number of unattended ground sensors and sensor strings are the portable III, AN/USQ-46A; signal data recorder, 30 pen, RO-376/USQ; BASS III sensor display unit (SDU); and the situation (map) display. Portable III provides a transient indication of sensor activations by means of lights in an 8x8 matrix; the Signal Data Recorder, RO-376/USQ, and the

BASS III SDU, are X-T plotters providing a permanent record of sensor activations; the situation (map) display uses lights in conjunction with a tactical map to provide a temporary, map-like representation of sensor activations.

11-16. Work/Rest Cycle

The monitoring of unattended ground sensor readout displays is a complex task for the human operator. He is required to interpret an abstract

representation of the tactical environment and to provide information rapidly on the detection, location, and movement of targets. In certain tactical situations indication of sensor activations will occur very infrequently; in other situations monitor operators may be required to respond to frequent sensor activations from a number of sensor strings.

a. Constant Monitoring. The monitoring of transient displays such as the portatale III requires the constant attention on the part of the operator. During periods of heavy activity, the number and pattern of activations may exceed the capacity of one individual to handle this information. Information may be lost, or may be significantly delayed in transmission. When monitoring transient displays, a 4 to 6 hour shift is the longest reasonable period.

b. Intermittent Monitoring. When monitoring permanent displays, such as the signal data recorder, RO-376/USQ, the operator is not required to constantly attend the display. He can be alerted to sensor activations by an audible or visible alarm signal and then may perform his interpretation of the activation pattern from the permanent record provided by the event recorders. An individual operator can monitor a larger number of sensors and works under less demanding conditions than the operator attending a transient display. Under such conditions, an operator can work an 8-12 hour shift.

11-17. Training

The task of the UGS readout operator is probably more difficult than that for any other type of STANO equipment. He must "interpret" sensor activation patterns to determine the identity, location, and direction and rate of movement of a target. Operator training must be given careful attention. He must learn how to recognize and identify sensor activation patterns and to correlate these with known sensor locations. Operators must become familiar with typical sensor configurations and the manner in which various activation patterns are translated into patterns on the display devices. In order to distinguish targetable from nontargetable activations, practical exercises must be given operators to improve and maintain their proficiency.

11-18. Techniques of Employment

Operators in the field can be expected to work under widely differing levels of activity. Operator performance becomes poorer as number of sensor activations increases. Under conditions of increased activity more men should be assigned to monitoring display devices. Under normal conditions, a Portatale operator can monitor one to two portatales, each receiving signals from an average of 20 individual sensors. Display devices providing a permanent record do not place as great a demand on the operator. Under normal conditions, an operator of these devices can monitor 25 to 30 sensor strings of 3 to 6 sensors each.

CHAPTER 12

STANO LOGISTICS

Section I. GENERAL

12-1. Purpose

This chapter contains procedures for supply and maintenance of STANO equipment. The broad aspects of combat service support are contained in FM 54-2 and FM 100-10.

12-2. Basic Considerations

The principles, techniques, procedures, and organizational concepts of combat service support in Army field manuals in support of units conducting ground, airborne, or airmobile operations apply, with modifications, to STANO operations. Emphasis is placed on insuring continued combat service support. Planners should anticipate and plan to counter the effects of losses of supplies,

equipment, and key personnel, as well as enemy interference with both surface and air movements in rear areas.

12-3. Support Command Elements

Combat service support units are organized to provide total support to the using unit. At division level, the combat service support units are located in the division support command (DISCOM) which includes, among other units, a maintenance battalion and a supply and transport battalion. Items of STANO equipment which have been type classified in accordance with AR 71-6 will be furnished support through the established combat service support structure.

Section II. MAINTENANCE

12-4. General

The four basic categories of maintenance (i.e., organizational, direct support, general support, and depot), are applicable to the support of STANO equipment. Maintenance of STANO equipment will be performed at the maintenance level where it can be most effectively and efficiently accomplished while maintaining or improving readiness on a cost effective basis. To achieve a proper balance of support, piece-part repair at the lower levels of maintenance will be limited to the maximum extent practicable. Return of equipment to an operational status normally will be by replacement of modules (assemblies/components). The application of direct exchange (DX) technique to all levels of maintenance will be exploited as a means of achieving operational ready equipment. Maintenance policies found in AR 750-1 and 750-5 are applicable to maintenance of STANO equipment. The Army Maintenance Management System (TAMMS) as described in TM 38-750 also applies.

12-5. Maintenance of Standard Equipment (less UGS)

a. Maintenance responsibilities are prescribed for each category in maintenance allocation charts found in the technical manual for that piece of equipment. Organizational maintenance is the responsibility of the using unit, usually the individual who uses the equipment. In units of greater equipment density, organizational maintenance mechanics may be authorized to maintain the equipment. Direct support (DS) maintenance will be provided by the divisional maintenance battalion for divisional units, and nondivisional DS maintenance will be provided for nondivisional units. The procedure for repair and return of STANO equipment from DS maintenance units is the same as for the repair of any other equipment.

b. General support (GS) maintenance of STANO equipment will be accomplished by GS units designated by FASCOM/TASCOM, or the

equipment will be returned to CONUS for repair. Once repaired, the equipment is returned to supply channels.

c. When, for any reason, an unserviceable STANO item cannot be repaired by the assigned maintenance category, the appropriate authority will direct its evacuation for repair by the next higher category. Normally, maintenance activities at the various categories will conform to prescribed allocations.

d. Controlled cannibalization, as outlined in AR 750-50, may be used as a source of repair parts and assemblies for the maintenance of STANO equipment.

12-6. Maintenance of Nonstandard, Developmental Items

a. In order to meet urgent operational requirements, STANO items may be issued to the field prior to adoption as a standard item. They may be limited production items or developmental items undergoing test and evaluation. These items may be deployed before provision for their support can be incorporated into the normal maintenance structure in the field. Special provisions for maintenance support are therefore required until such time as the equipment is type classified and the normal maintenance structure is capable of providing the necessary support.

b. Nonstandard developmental items normally are supported by new equipment training teams (NETT), Army technical representatives, and contractor representatives who accompany the items to the field. The teams and individuals train military operators and maintenance personnel in support of the equipment during the early stages of deployment. Repair parts support is expedited by the establishment of high priority supply channels and procedures. As soon as the normal logistics support structure is able to assume responsibility for maintenance of the equipment, the special teams and individuals are withdrawn. This transfer of responsibility may be accomplished prior to adoption of the item as standard A.

12-7. Maintenance of Unattended Ground Sensors (UGS)

a. Commanders authorized UGS will stress the need for good preventive maintenance and, when possible, recover sensors for reuse or parts salvage because of the high cost of the items.

b. Organizational maintenance of UGS is very

limited, and consists mostly of cleaning, adjusting, and battery replacement or charging, normally performed by the individual who emplaces the sensor. These individuals are located in the infantry, armor, armored cavalry, and divisional field artillery units of the division. An assembly section established within the maintenance battalion of the division support command (DISCOM) will be responsible for all authorized assembly of modules for Phase III unattended ground sensors. The assembly sections will be located in the main support company and in each of the forward support companies of the maintenance battalion. (See figure 12-1 for normal support and control channels.) The available assets at any level may result in the elimination of one or more of these steps.

c. In limited warfare situations, the normal support channels as portrayed in figure 12-1 will be adjusted to accommodate the committed force structure and density of UGS in use. Both the assembly and maintenance of the UGS will be retained by a DS maintenance unit supporting the committed force.

d. Unattended ground sensors and their associated equipment (e.g., readout devices) will be supplied through normal Class IX, VII, and V supply channels to the designated DS unit in the overseas theater. DS units will uncrate equipment; assemble, test, and replace components and repair if necessary and, as requisitioned, issue to using organizations. Using organizations will have copies of the instruction books or support packages furnished with each unit of equipment. These publications contain operating instructions, procedures to determine if equipment is operating properly, and certain limited information on field care (e.g., external cleaning and battery replacement). Using organizations will evacuate unserviceable items through normal division support command supply channels, who in turn will coordinate further evacuation through established evacuation channels (fig 12-1). Direct exchange of a limited number of major assemblies and components will be made from float stockage retained at the divisional direct support unit. These DS maintenance units having certain levels of repair parts available will repair the equipment and return it to stock for reissue, or unrepairable items will be evacuated through maintenance channels to the designated CONUS depot or contract facility.

e. In-theater UGS maintenance is limited to the replacement of major subassemblies, selected re-

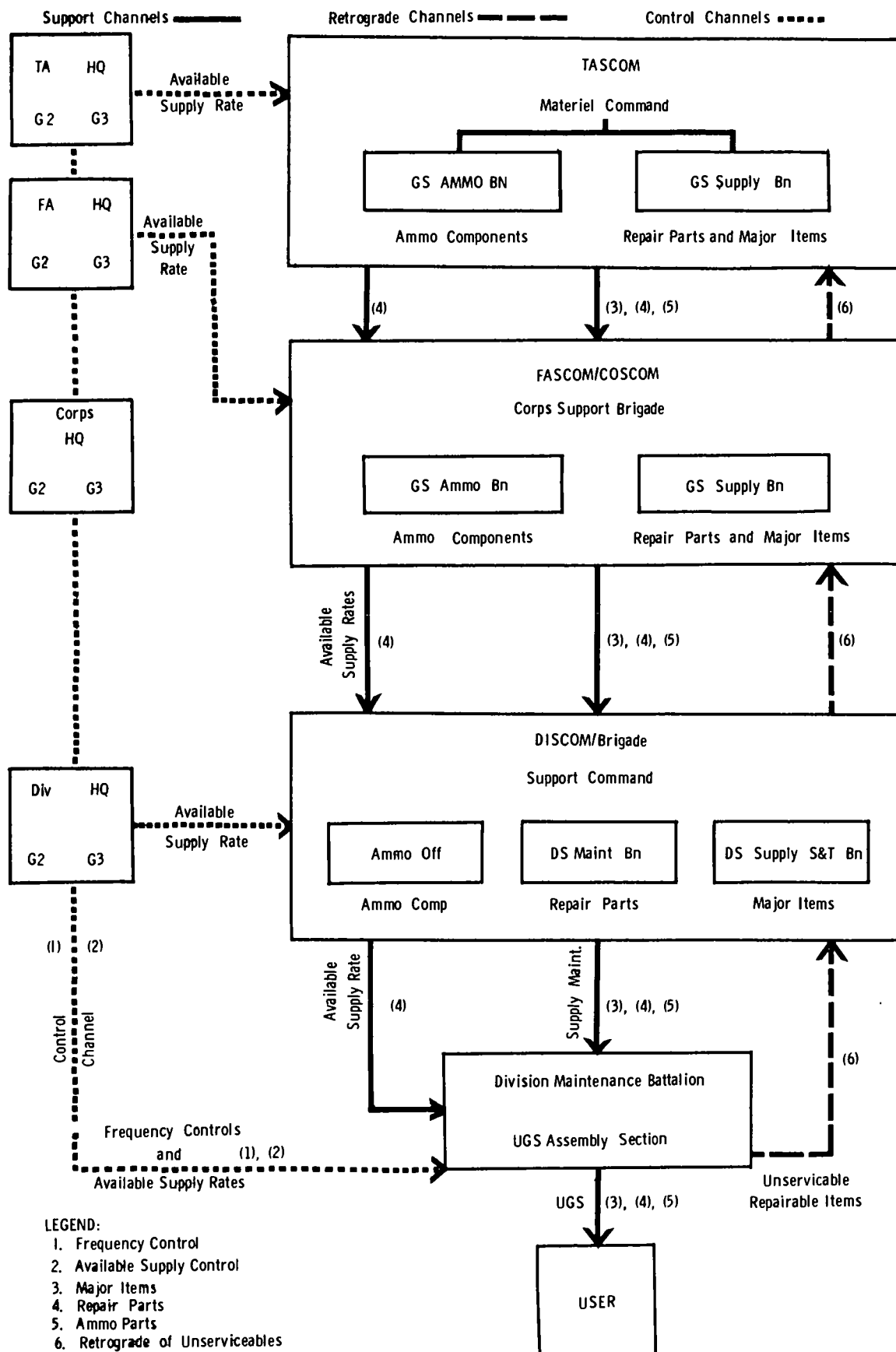


Figure 12-1. Control and support channels for UGS and associated equipment.

pair parts, cables, connectors, batteries, and verification that the assembly replacement has restored the item to satisfactory service.

f. Radio sets, ancillary equipment, test sets, and battery chargers are nonconsumable, recoverable items. Maintenance of this type equipment normally is performed by divisional DS units in accordance with the published maintenance allocation charts (MAC).

g. All incoming materiel will be inspected and tested as soon as possible by the central control point where the theater direct support facility will be jointly located. Assembled devices must be tested using the appropriate readout devices; components will be tested with "go-no-go" testers developed for the purpose. Proper diagnostic testing and inspection is the responsibility of designated personnel at each category of maintenance, and plays a predominant role on those devices recovered from tactical operations. Therefore, testing is accomplished at the lowest level of maintenance support capable of returning the equipment to a serviceable condition.

h. The repair or replacement of unserviceable assembled devices and their associated assemblies will be accomplished as follows:

(1) Unserviceable assembled devices will be repaired by the replacement of repair parts as indicated in the maintenance allocation charts of the published TM.

(2) Unserviceable recoverable repair parts (i.e., assemblies and subassemblies) will be re-

placed or repaired only at the divisional direct support units.

i. UGS and related equipment requiring overhaul will be evacuated through normal maintenance channels and be rebuilt only in designated CONUS facilities.

12-8. Maintenance of Test, Measurement, and Diagnostic Equipment (TMDE)

a. With the exception of equipment requiring calibration by an army calibration company (FM 29-27), direct support units are responsible for calibration of their assigned test and measuring equipment, and that of supported units (AR 750-25). The frequency of maintenance calibration checks is established in pertinent technical manuals. Maintenance calibration checks require certification and documentation as prescribed in TM 38-750.

b. General and depot support maintenance units have responsibilities similar in scope to those of direct support units, except that they normally repair TMDE for return to stockage rather than to supported units. General support and depot units accomplish maintenance calibration of repaired items as well as their own TMDE.

c. The army calibration company performs secondary reference and transfer calibrations for units assigned to the field army. This company may also perform maintenance calibration as required.

Section III. SUPPLY

12-9. General

The principles of supply support of STANO equipment are essentially the same as those for other items of supply. The supply support system for STANO operations incorporates the standard requisition, receipt, and issue procedures outlined in AR 725-50 and the Army field stock control procedures described in AR 711-16. AR 735-35 contains guidance for property accountability within the using unit, while FM 29-10 and FM 29-10-1 provide information on supply management in the field army. The requisitioning and supply flow channels are shown in solid lines in figure 12-1.

12-10. Supply of End Items

a. Equipment will be supplied from CONUS lo-

cations to the designated supply unit whether located in an overseas theater or in CONUS. Supplies at the DS supply unit, whether divisional or nondivisional, are supplied from the GS supply unit in accordance with standard requisitioning procedures. TOE equipment will be requisitioned as outlined in AR 725-50. Developmental and non-standard items will be issued or requisitioned by direction of the tactical commander. Accountability of STANO equipment by the using unit is the same accountability as for any other nonconsumable recoverable item. AR 735-35 provides guidance for property accountability within the using unit. Authorized stockage lists of end items in the field army are subject to continuous review, and will change as basis of issue plans are developed and the STANO equipment is field tested and evaluated.

b. Operational readiness floats of selected end items/major components are stocked at maintenance activities such as DS units in order to have readily available serviceable stocks to provide to the user in cases where normal maintenance actions will create unacceptable delay in unit operational readiness. In the division, the division commander will establish policies for the use of float items.

c. The operational and design characteristics of UGS are such that the support system will not be capable of issuing a usable end item. It is therefore necessary to provide components (modules) and parts only. The assembly sections located in the maintenance battalion of the division will be the designated place from which a usable UGS can be obtained. The components and parts from which the UGS are assembled will be received through the DS maintenance company supporting its respective brigade element within the division. Coordination with the division ammunition officer for artillery- and mortar-delivered sensors is imperative to insure correct frequency settings. Requests for these type sensors will be handled in the same manner as requests for conventional ammunition. Nonexpendable supporting equipment such as readout units and tools and test equipment will be provided through the designated DS supply and transport unit. Requisitions for unattended ground sensors will be forwarded from the separate battalions in the division employing UGS to the assembly section of their DS maintenance unit. For nondivisional units the same procedure will apply. Requisitions will identify the type and quantity of sensors, information on the desired frequency, commandability, and priority designation. Higher tactical headquarters will monitor these requests and provide necessary guidance in the event of short supply or channel tone code management problems. When unattended ground sensors are in short supply, available supply rates will be established by the theater army commander for each tactical unit as well as combat support and combat service support elements. Requisitions are honored at theater army level based on the current or future needs of the unit and policies established by the theater commander. Unattended ground sensors are accounted for and maintained until emplaced or until such time as the item is expended.

d. The division G4 will ascertain, by coordinating with the G2/G3, the allocation of unattended ground sensors to brigade- and battalion-size units. The G4 guidance will be directed to the division support command—specifically, the sup-

ply and transportation battalion—for receipt, storage, and issue of major end items of Phase II unattended ground sensors and related equipment, and to the maintenance battalion for receipt, storage, and issue of Class IX repair parts for Phase III unattended ground sensors.

12-11. Supply of Class IX—Repair Parts (Less UGS)

a. At the direct support level, Class IX supplies (less UGS) are provided through maintenance channels. Repair parts may be obtained by the UGS employment officer from the division maintenance battalions and direct support maintenance battalions supporting nondivisional units. The standard requisitioning procedures outlined in current supply publications will be followed.

b. At the general support level, repair parts (less UGS) are provided through supply channels. These supply channels are established in general support repair parts supply units in the corps support brigade.

c. Direct support and general support units deal with the support brigade stock control center (SCC) on day-to-day supply operations matters, and with command headquarters on policy matters. Requisitions are placed directly with the support brigade SCC by the maintenance support companies. When repair parts are not available at any of the repair parts companies within the brigade, the SCC transmits the requirements to the field army support command (FASCOM) inventory control center (ICC). Replenishment of demands for supplies not within the resources of the FASCOM are placed upon the theater Army support command (TASCOM) in the COMMZ.

d. Direct exchange (DX) is encouraged for STANO repair parts, components, and assemblies. The DX system can be established as soon as there are sufficient Class IX supplies in the system to support the density of the STANO equipment. The direct exchange system is discussed in FM 29-22.

12-12. Care and Prevention

Environmentally controlled storage is desirable for dry cell batteries, pyrotechnic devices, and ammunition items in order to minimize deterioration. Stocks on hand in the theater should be kept at a minimum consistent with operational requirements to reduce demands on storage facilities. Items placed in storage should be preserved-packaged and packed level A.



CHAPTER 13

STANO SUPPORT FROM OTHER SERVICES

13-1. Support by Tactical Air Force

a. Tactical air reconnaissance elements of the Air Force normally support both Army and Air Force intelligence requirements. Tactical air reconnaissance is one of the sources of intelligence information available to the Army commander for planning purposes and for support of immediate operational requirements. Tactical air reconnaissance units are capable of performing all missions within the entire spectrum of air reconnaissance—both day and night—and in most weather conditions. The Air Force normally provides a tactical air reconnaissance wing in support of a field army. The reconnaissance wing will have a reconnaissance technical squadron that has a photo processing and imagery interpretation capability. Usually, this capability is concentrated at the wing level, when required; however, personnel and equipment from this squadron may be collocated with one or more reconnaissance squadrons to provide direct support. The reconnaissance squadrons usually operate from improved airfields dispersed throughout the theater of operations. Each squadron may be equipped to provide only a portion of the total reconnaissance capability (i.e., one may be a day squadron for visual, photographic, infrared and radar reconnaissance, and one for collection of weather data and enemy electronic order of battle). Conversely, each squadron may be equipped to perform all the above functions on a continuous basis, or may provide a major capability in one area and a limited capability in another area. The composition and mix of reconnaissance squadrons is the responsibility of the senior AF commander. The military intelligence battalion, air reconnaissance support, (MI-BARS) in coordination with the G2 air, has the mission of providing the required Army liaison and coordination with TAC Air or reconnaissance efforts.

b. Requests for aircraft flare illuminating missions are submitted in the same manner as requests for other air support missions. An immediate mission may be assigned to Army aircraft or

it may be forwarded through air support request channels to the direct air support center (DASC). Preplanned requests are forwarded through Army channels to the tactical air support element (TASE) at the FATOC. The unit requesting the illumination will be advised of approval or disapproval of the mission. Requests for illumination must be coordinated in the same manner as requests for other fire support. Coordination should include, but not be limited to, control communications, liaison with adjacent units, and air defense unit notification. (See FM 20-60 and FM 30-20.)

c. In the employment of unattended ground sensors, the Army may request the following support from the Air Force or other Services:

(1) Aerial emplacement of sensors in areas beyond the range of organic Army delivery means, and in other situations where Army emplacement is impractical or inappropriate.

(2) Aerial radio relay support in tactical air environments which preclude the use of organic Army aircraft as aerial radio relay platforms.

(3) Aerial resupply of sensors and ancillary equipment to long-range reconnaissance ranger patrols, special forces elements, and clandestine agents when delivery by organic Army means is impracticable.

13-2. Navy and Marine Corps Air Support

a. When Navy or Marine Corps air units provide the preponderance of air support to Army operations, operational procedures will be established by the joint force commander. As far as possible, these procedures should reflect the general doctrine presented in FM 30-20.

b. Navy and Marine Corps air reconnaissance units possess the necessary aircraft and imagery-producing sensors to accomplish the same types of missions as those performed by the AF. These units also have an organic capability to process and interpret imagery returns.

c. Dependent upon operational requirements

FM 31-100 (TEST)

and the volume of support being provided, Navy and Marine Corps imagery may be delivered to the military intelligence battalion where the air reconnaissance support detachments are located. A portion of the MIBRAS personnel, to include entire detachments, may be located aboard ship or at a Marine airbase to aid in processing and interpreting exposed imagery. The MIBARS headquarters has the capability to create a fifth military intelligence detachment (air reconnaissance support) (ARS) for special operations. In addition, a separate military intelligence detachment (ARS), not organically part of an existing MIBARS organization, can be organized to fill special requirements to operate with a Navy or Marine air reconnaissance unit at the same time that the existing MIBARS organization continues to function in support of a TAF reconnaissance wing.

d. Navy and Marine Corps air reconnaissance

units may require that a liaison officer be located with their flying elements. When required, liaison officers can be procured by using imagery interpretation officers from the imagery interpretation sections within MIBARS or from the imagery interpretation section organic to the military intelligence organization in support of the Army combat units.

e. Naval illuminating shells are available for 5-inch and 6-inch naval guns only. Battleships, heavy cruisers, light cruisers, and destroyers mount the 5-inch or 6-inch gun either as the primary or secondary battery. When the tactical situation is such that naval fire support is to be furnished to ground forces, naval illumination may be requested through fire support channels. The request should include information similar to that required for aircraft flare illumination (FM 20-60).

APPENDIX A

REFERENCES

A-1. Army Regulations (AR)

(C) 10-122	The US Army Security Agency (U)
105-87	Electronic Warfare
310-3	Preparation, Coordination, and Approval of Department of the Army Publications
310-25	Dictionary of United States Army Terms (Short Title AD)
310-34	Equipment Authorization Policies and Criteria, and Common Tables of Allowances
310-49	The Army Authorization Documents System (TAADS)
570-2	Organization and Equipment Authorization Tables —Personnel
711-16	DSU/Installation Stock Control and Supply Procedures (Army Field Stock Control System)
725-50	Requisitioning, Receipt and Issue System
735-35	Supply Procedures for TOE and TDS Units or Activities
750-1	Maintenance Concepts
750-5	Organization, Policies, and Responsibilities for Maintenance Operations
750-25	Army Metrology and Calibration System
750-50	Use of Controlled Cannibalization as a Source of Repair for Supply Augmentation
755-1	Reporting, Utilization, and Redistribution of Installation, U.S. Army Materiel Command, and Overseas Command Excess Personal Property

A-2. Field Manuals (FM)

1-15	Aviation Battalion, Group, and Brigade
1-80	Aerial Observation Techniques and Procedures
1-100	Army Aviation Utilization
1-110	Armed Helicopter Employment
5-1	Engineer Troop Organizations and Operations
6-20-1	Field Artillery Tactics
6-20-2	Field Artillery Techniques
6-115	The Field Artillery Searchlight Battery
6-120	Field Artillery Target Acquisition Battalion and Batteries
6-121	Field Artillery Target Acquisition
6-122	Artillery Sound Ranging and Flash Ranging
6-140	Field Artillery Cannon Battalions and Batteries
6-160	Counterbattery Radar Set AN/MPQ-10A
6-161	Radar Set AN//MPQ-4A

6-162	Radar Set AN/TPS-25
7-10	The Rifle Company, Platoons, and Squads
7-20	The Infantry Battalions
17-1	Armor Operations
17-15	Tank Units, Platoon, Company, and Battalion
17-30	The Armored Brigade
17-36	Divisional Armored and Air Cavalry Units
17-95	The Armored Cavalry Regiment
19-1	Military Police Support, Army Divisions and Separate Brigades
19-4	Military Police Support, Theater of Operations
20-20	Military Dog Training and Employment
20-32	Landmine Warfare
20-32A	Landmine Warfare (Scatterable Mines)
20-60	Battlefield Illumination
21-50	Ranger Training and Ranger Operation
21-75	Combat Training of the Individual Soldier and Patrolling
24-1	Tactical Communication Doctrine
24-18	Field Radio Techniques
29-3	Direct Support Supply and Service in the Field Army
29-10	Supply Management in the Field Army
29-10-1 (Test)	The Field Army Supply Management System
29-22	Maintenance Battalion and Company Operations (Nondivisional)
29-27	Army Calibration Company
29-30	Maintenance Battalion and Company Operations in Division and Separate Brigades
29-45	General Support Supply and Service in the Field Army
29-45-1 (Test)	General Support Supply and Service in the Field Army
30-5	Combat Intelligence
30-9	Military Intelligence Battalion, Field Army
30-16	Technical Intelligence
30-20	Aerial Surveillance-Reconnaissance, Field Army
31-1 (Test)	Surveillance, Employment of Unattended Ground Sensors
31-2 (Test)	Surveillance Target Acquisition and Night Ob- servation (STANO) Doctrine
31-10	Denial Operations and Barriers
31-16	Counterguerrilla Operations
31-18	Long Range Reconnaissance Ranger Company
31-21	Special Forces Operations—U.S. Army Doctrine
31-23	Stability Operations, U.S. Army Doctrine
31-25	Desert Operations
31-35	Jungle Operations
31-36 (Test)	Night Operations
(C) 31-40	Tactical Cover and Deception (U)
31-55 (Test)	Border Security/Anti-Infiltration Operations
31-60	River-Crossing Operations
31-70	Basic Cold Weather Manual
31-71	Northern Operations
31-72	Mountain Operations

31-81 (Test)	Base Defense
31-85	Rear Area Protection (RAP) Operations
(C) 32-5	Signal Security (SIGSEC) (U)
(S) 32-10	United States Army Security Agency in Support of Tactical Operations (U)
(C) 32-20	Electronic Warfare (Ground Based) (U)
(S) 32-20A	Electronic Warfare (Ground Based) (U)
33-1	Psychological Operations—U.S. Army Doctrine
33-5	Psychological Operations—Techniques and Pro- cedures
41-5	Joint Manual for Civil Affairs (OPNAV O 9B2P1/AFM 110-7/NAVMC 2500)
41-10	Civil Affairs Operations
44-3	Air Defense Artillery Employment, CHAPAR- RAL/VULCAN
54-2	The Division Support Command and Separate Brigade Support Battalion
57-1	U.S. Army/U.S. Air Force Doctrine for Airborne Operations
57-35	Airmobile Operations
57-38	Pathfinder Operations
61-24	Division Communications
61-100	The Division
100-5	Operation by Army Forces in the Field
100-10	Combat Service Support
100-20	Field Service Regulations—Internal Defense and Development (IDAD) (U)
100-26	The Air-Ground Operation System
101-5	Staff Officers' Field Manual. Staff Organization and Procedure



APPENDIX B

EQUIPMENT

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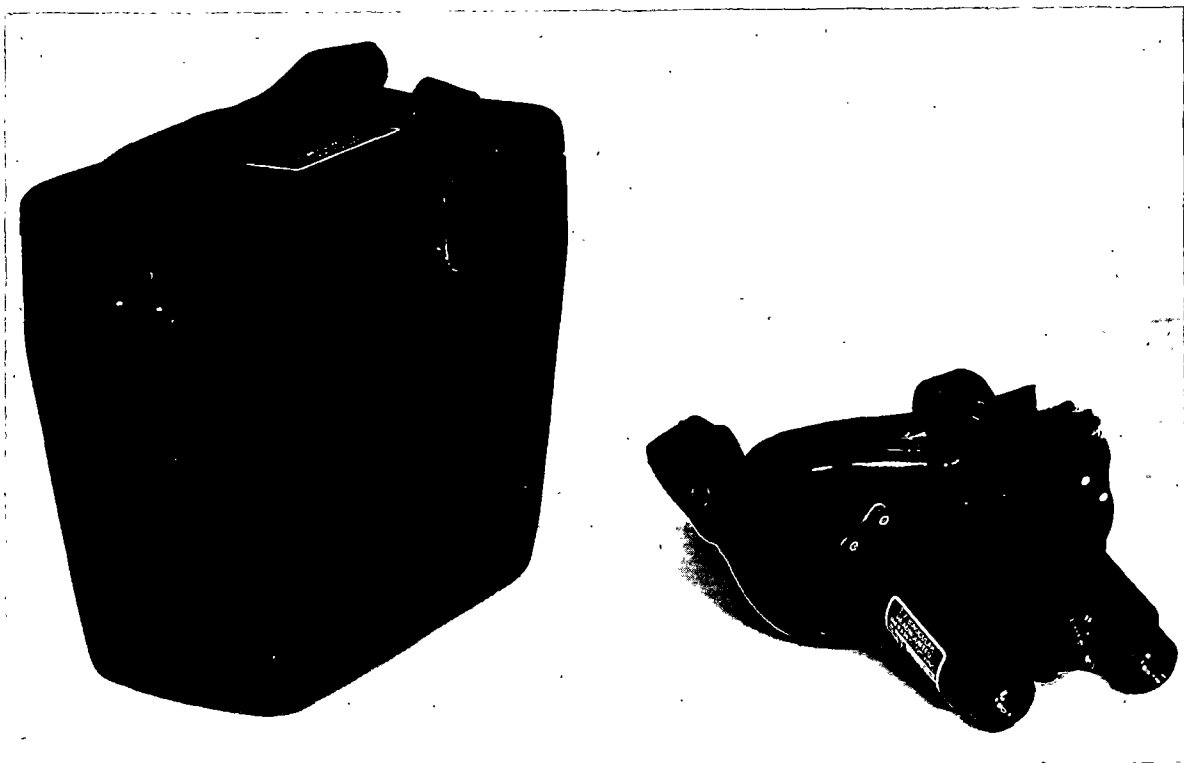


Figure B-1. AN/PAS-5, binocular, electronic.

TAB 1

AN/PAS-5, Binocular, Electronic

1. Description and Use:

Primary mission is to permit vehicle operation during darkness without use of visible light. Secondary missions are to detect enemy IR sources, locate and read road signs, and perform other close-up tasks at night. Individual user adjusts the binoculars to his face and controls operation by one switch. Individual objective focus is provided for each eye. For most driving use, IR covers are attached to headlights and taillights. In some instances IR searchlights may be used. The AN/PAS-5 has no capacity to function without an external light source. Level of employment is dictated by requirement for covert night driving.

2. Characteristics:

- a. Size: $1\frac{1}{2}'' \times 4\frac{1}{4}'' \times 3\frac{1}{2}''$ without case; $8'' \times 9\frac{1}{4}'' \times 5\frac{3}{8}''$ with case.
- b. Weight: 12 ounces; with headmount—19 ounces; with case—24 ounces.
- c. Field of View: 27° (480 mils).
- d. Power Source: 1.3 volt mercury battery (disposable), 40 hrs continuous operation.
- e. Magnification: 1X.
- f. Crew: 1 man.
- g. Transport: Manportable in case.

3. References:

TM 11-5855-210-12
TM 11-5855-210-35

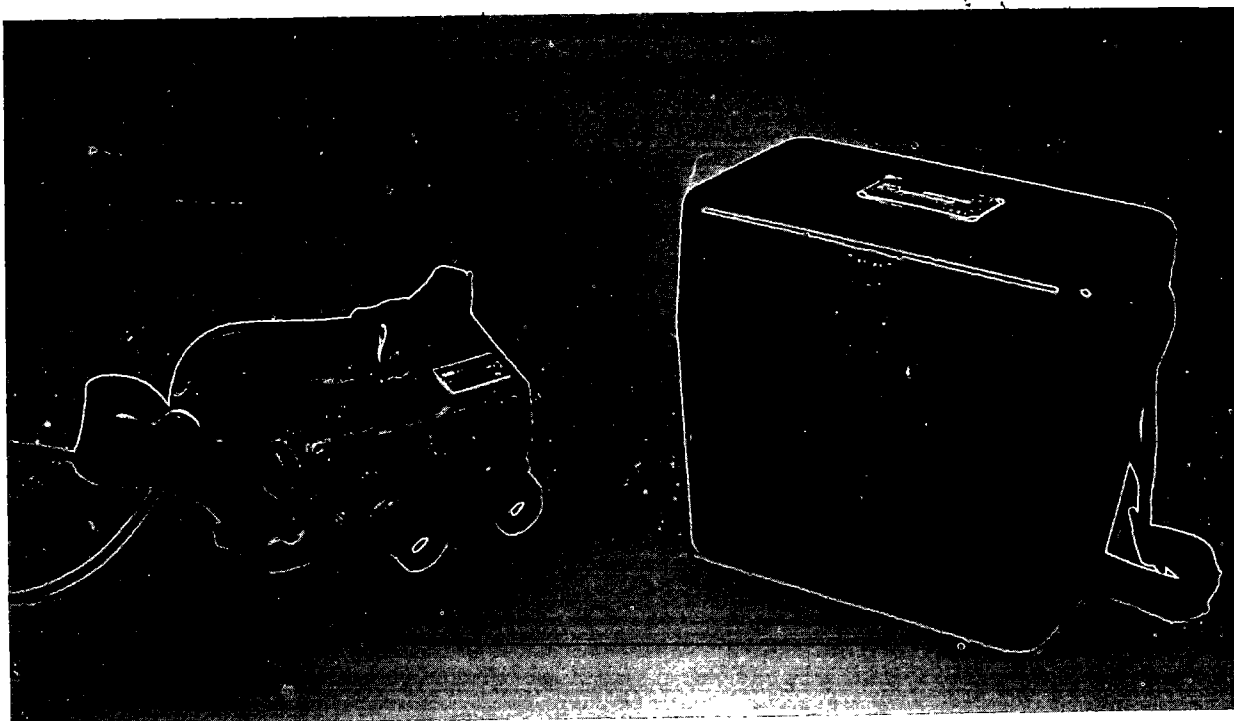


Figure B-2. SU-50 binoculars, electronic.

TAB 2

SU-50, Binocular, Electronic (Goggles)

1. Description and Use:

The individual user fits the binoculars to his face and places the unit in operation by a switch. The objective lenses can be focused for each eye separately. Mounting of the aiming light and rifle is a separate operation. A lightweight, face-mounted, passive night vision device for performing individual tasks during the hours of darkness, utilizing ambient radiation. Designed for short-range, close-in viewing for driving tracked or wheeled vehicles, reading maps and other documents, administering medical aid, maintenance, and other individual tasks providing maximum security from detection by the enemy during use. May also be used by infantrymen with AN/PAS-8 aiming light mounted on rifle to enhance accurate night firing without conventional aiming.

2. Characteristics:

- a. Size: $5\frac{1}{2}'' \times 3\frac{1}{4}'' \times 4''$ (approx).
- b. Weight: 1.5 pounds (max).
- c. Field of View: 60° (1080 mils).
- d. Magnification: 1X.
- e. Crew: 1 man.
- f. Transport: Manportable in case.

3. References:

AMC STANO Catalog March 1970

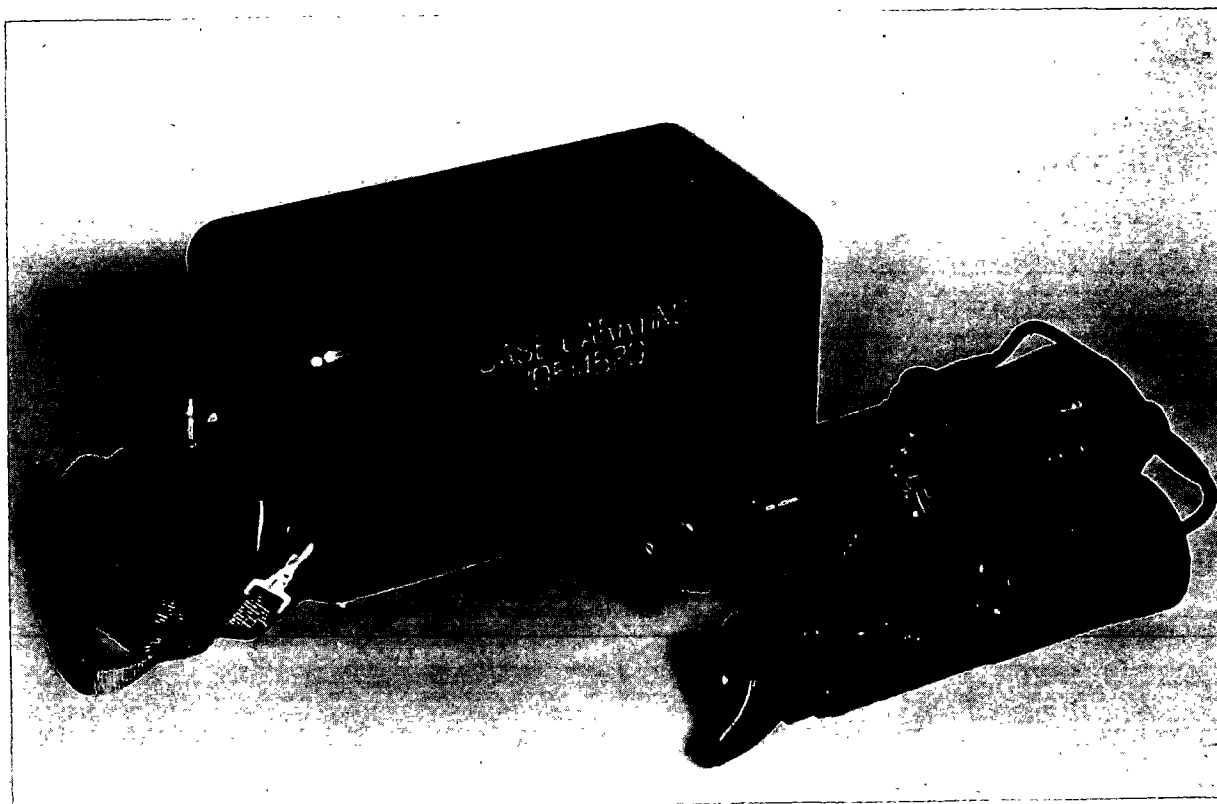


Figure B-3. Binocular, IR, M18.

TAB 3
Binocular, IR: M18

1. Description and Use:

General observation at night using an infrared source of energy. Reflected infrared energy is converted to visual images and viewed with conventional eyepieces. Handheld instrument for viewing those portions of the environment illuminated by the IR source.

2. Characteristics:

a. Type: Binocular instrument with two image-converter tubes as part of separate optical systems for the right and left eye with individual diopter adjustments and interpupillary adjustment.

b. Weight: 5 lbs.

c. Power Sources: Internal high voltage with 1.5 vdc battery primary source.

d. Range: Contingent on IR illumination of scene.

e. Resolution: 50 line pairs/mm minimum.

f. Wavelength: Near infrared.

g. Peak Power: N/A.

h. Average Power: N/A.

i. Display: Visual picture.

j. Magnification: 3.5X.

k. Field of View: 12° 30'.

3. References:

TM 9-6650-215-12



Figure B-4. Cobra night fire control system.

TAB 4

Cobra (AH-1G) Night Fire Control System (CONFICS)**1. Description and Use:**

To extend the fire control capabilities of the Cobra Armament Subsystem to low light level operations. The sensor will be mounted in a turret component gimballed platform on the nose of the helicopter with an eight inch monitor remote display mounted in the lower portion of the center windshield canopy for the gunner's use. A covert illuminator is slaved to the sensor for active use. This arrangement will permit the Armament Subsystem to be employed in a normal daytime fashion but under low light level conditions.

2. Characteristics:

- a. Weight: Estimated 380 total pounds.
- b. Personnel: Copilot/gunner.

3. References:

AMC STANO Catalog March 1970



Figure B-5. AN/ASQ-132 INFANT.

TAB 5

Image Intensifier System, Night Vision AN/ASQ-132 (INFANT)

1. Description and Use:

To provide an improved, integrated, target acquisition and fire control system which will enable the crew of a rotary-wing aircraft to detect ground targets using light amplification sensors, recognize them from real-time displays, and accurately direct the fire of all on-board weapons systems. The system may be used as an aid to navigation. Imagery from the remote view sensors will be displayed on separate cathode ray tube monitors provided for the pilot, copilot, and crew. An optical light will be provided by two weapon-mounted xenon pink filter searchlights.

2. Characteristics:

a. Type: Air-to-ground passive, light amplification integrated target acquisition and fire control system.

b. Weight: 600 lbs.

c. Display: Direct view sensor—copilot/gunner; remote view CRT—pilot, copilot, and crew.

d. Crew: Four-man aircraft crew.

e. Transport: Helicopter.

3. References:

AMC STANO Catalog March 1970

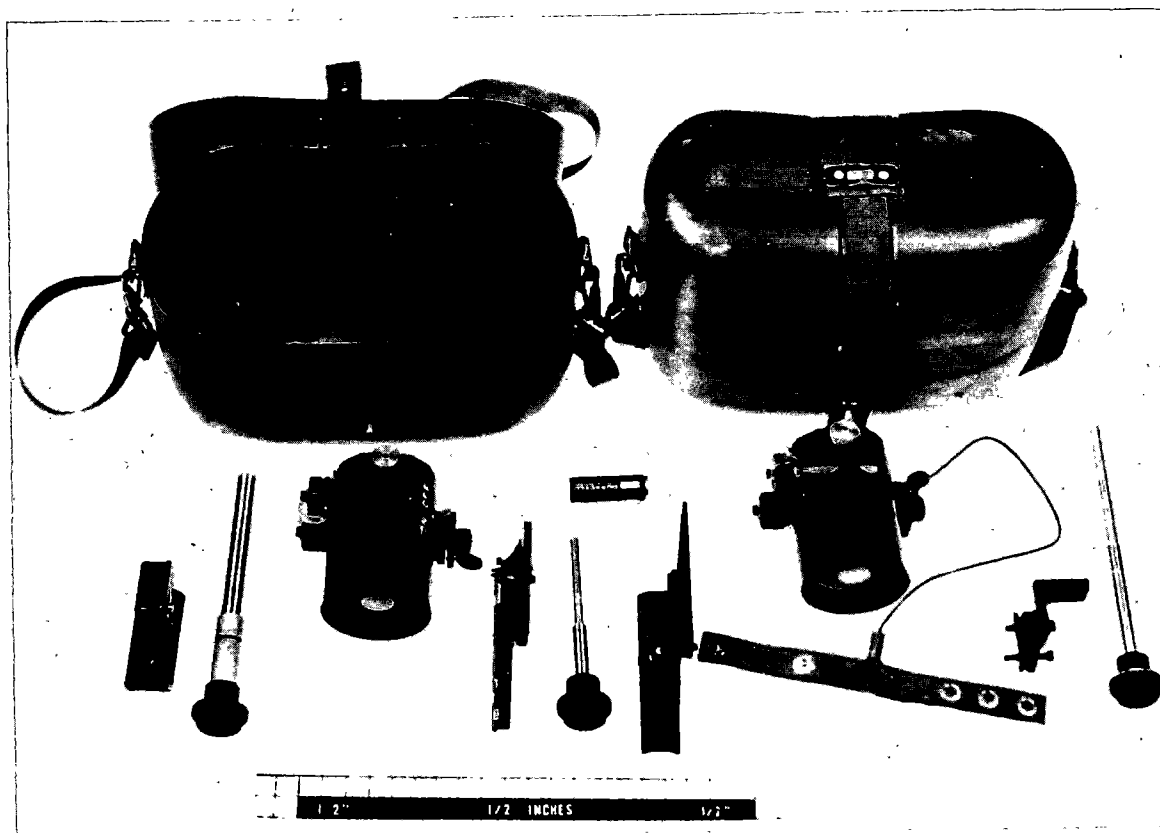


Figure B-6. AN/PAS-8, light, aiming, infrared.

TAB 6

AN/PAS-8, Light, Aiming, Infrared

1. Description and Use:

To provide a portable infrared aiming device to be used for accurate night firing of military rifles. The aiming device is mounted to the rifle and used in conjunction with the SU-50, Binoculars, Electronic (goggles) to provide infantrymen with an extremely effective night fighting capability. The main housing of the device is securely clamped to the weapon, and the optical elements within the housing range. The light source is flickered to improve the visibility of the projected spot by making it easily distinguishable from any ambient lighting in the viewed background. Operation of the device is controlled by a sealed pressure switch that is mounted to the rifle (weapon) stock with webbing straps.

2. Characteristics:

- a. Size: 4" × (1) × 3" (D).
- b. Weight: 1 pound.
- c. Power Source: Internal mercury battery (disposable).
- d. Transport: Manportable in case when not attached to rifle.

3. References:

AMC STANO Catalog March 1970



Figure B-7. Metascope, AN/PAS-6.

TAB 7

Metascope, AN/PAS-6

1. Description and Use:

For nighttime use as an aid in detection of enemy use of near infrared sources; as an assembly or signalling aid; as a night viewing aid when used with auxiliary infrared sources; or as a night reading aid using its own infrared light source. The Metascope is a multipurpose, monocular, infrared viewer. The viewer, when used in detecting enemy use of infrared light, has a range of several miles. If used with high-intensity, infrared light sources, such as infrared searchlights, its useful viewing range is greatly extended. Another use is for troop assembly by homing in on an infrared beacon.

2. Characteristics:

- a. Type: Handheld, near-infrared, monocular, viewing device equipped with a small battery-powered infrared light source.
- b. Tube Type: Image converter tube.
- c. Weight: 2 lbs.
- d. Field of View: 25 degrees.
- e. Magnification: 1X.
- f. Battery Life: 8 hrs.
- g. Metascope Life (Tube): 200 hrs.
- h. Operating Temperatures: -25° to $+115^{\circ}\text{F}$.

3. References:

TM 5-1090-203-15

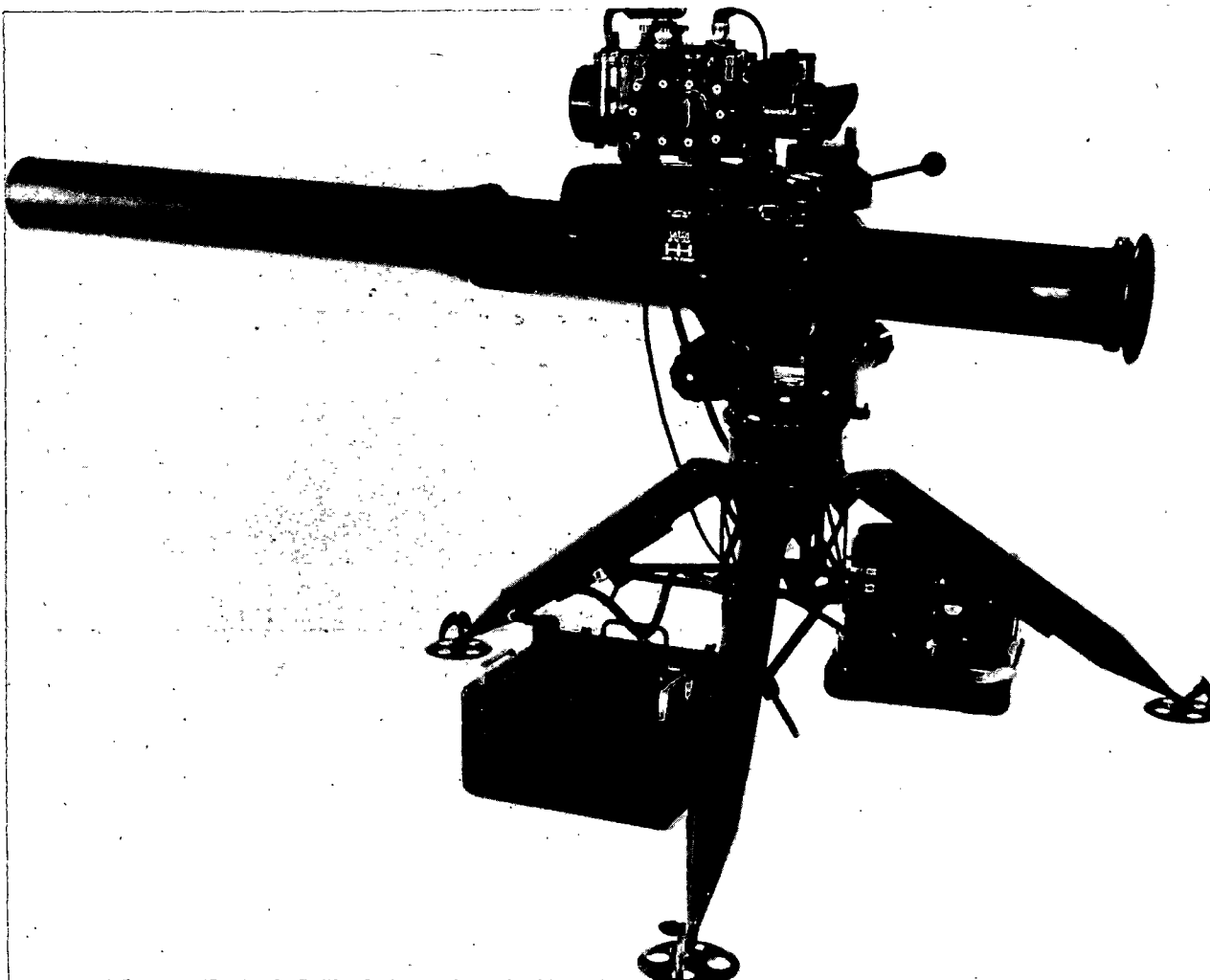


Figure B-8. Night sight for TOW.

TAB 8
Night Sight for TOW

1. Description and Use:

To provide TOW with a night capability. TOW fulfills the Heavy Antitank/Assault Weapon (HAW) requirement. The Night Sight belts on to the day sight-tracker unit which is mounted to the TOW tripod. The TOW system is employed to provide infantry battalions a day/night anti-tank capability.

2. Characteristics:

- a.* Weight: 57 lbs.
- b.* Power Source: Battery.
- c.* Display: Direct view image intensifier.
- d.* Crew: TOW crew.
- e.* Transport: Transported with TOW—jeep, mule, M113, or man (crew).

3. References:

AMC STANO Catalog March 1970

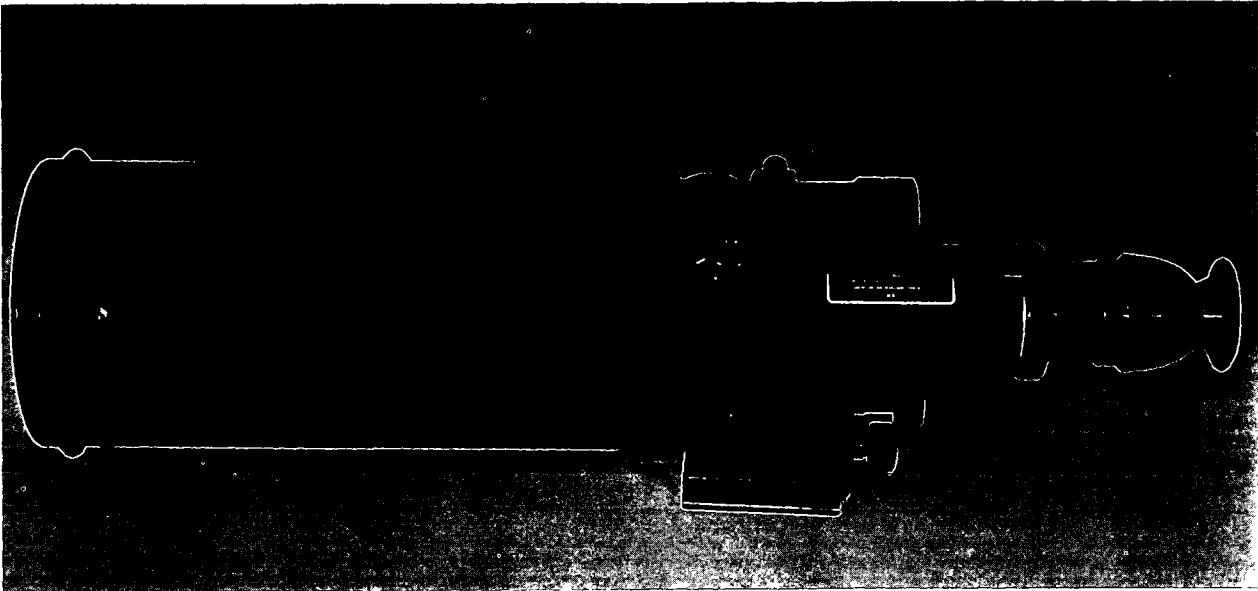


Figure B-9. AN/TVS-2, CSWS.

TAB 9

AN/TVS-2, Night Vision Sight, Crew-Served Weapons (Crew-Served Weapons Sight)**1. Description and Use:**

Primary mission is to provide a means for accurate aimed fire of Crew-Served Weapons at night. Secondary mission is for use in forward areas as a tripod-mounted night vision observation device to detect, identify, and observe friendly and enemy operations and/or to direct fire control of artillery. In each instance, this passive device uses ambient light (moonlight or starlight) for illumination. In the aimed-fire role, the device is mounted on and boresighted to the weapon (usually a machine gun or recoilless rifle but sometimes AA guns or other weapons/weapon systems) which is then used in its prescribed mission. (The sight is easily dismounted to permit unimpeded daylight use of the weapon.) In the tripod-mounted role, it is emplaced on the best available vantage point overlooking the terrain of interest to assist the user in his primary mission. No artificial light source, visible or IR, is required if there is any ambient light. This minimizes the chance of enemy detection.

2. Characteristics:

- a. Size: 24.5" × 6.4" × 8".
- b. Weight: 15 lbs, 4 oz.
- c. Crew: 1 man.
- d. Transport: Manportable in case.
- e. Magnification: 7X.

3. References:

TM 11-5855-202-13
TM 11-5855-202-45P



Figure B-10. AN/PVS-2, starlight scope.

TAB 10

AN/PVS-2, Night Vision Sight, Individual Served Weapon (Starlight Scope)**1. Description and Use:**

Primary mission is for use in forward areas as a handheld night observation device to detect, identify, and observe friendly and enemy operations. Secondary mission is to provide a means for accurate aimed fire of individual or crew-served weapons at night. In each instance, this passive device uses ambient light (moonlight or starlight) for illumination. Used in the handheld role by forward observers, including recon and ranger units, as well as radar operators who frequently depend on the AN/PVS-2 for final identification of the target detected. In the aimed-fire role it is mounted on and boresighted to the weapon which is then used in its prescribed mission. (The Sight is easily dismounted to permit unimpeded daylight use of the weapon.) No artificial light source, visible or IR, is required if there is any ambient light. This minimizes the chance of enemy detection.

2. Characteristics:

- a. Size: 17.5" × 3.2".
- b. Weight: 5.75 pounds.
- c. Crew: 1 man.
- d. Transport: Manportable in case.
- e. Magnification: 4X.

3. References:

TM 11-5855-203-13
TM 11-5855-203-45

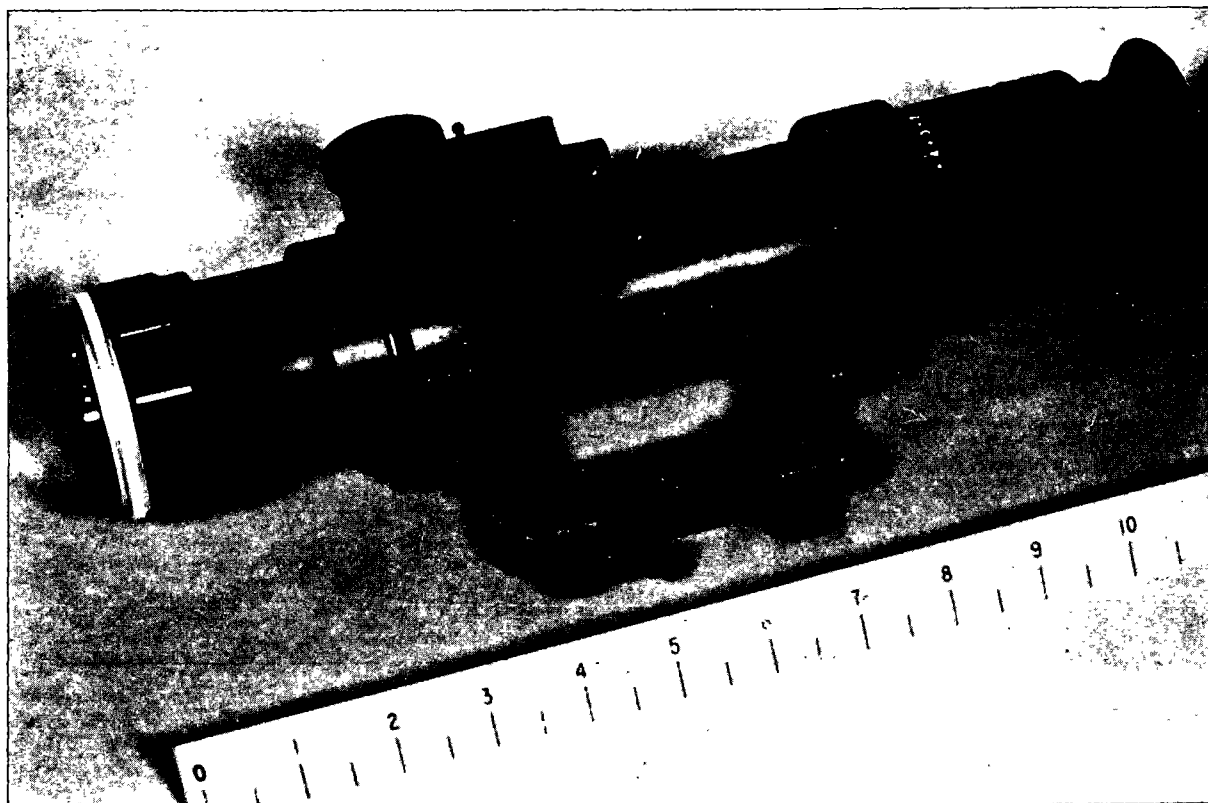


Figure B-11. AN/PVS-3, miniscope.

TAB 11

AN/PVS-3, Night Vision Sight, Miniaturized (Miniscope)**1. Description and Use:**

Primary mission is for surveillance as a handheld passive, night vision device. Secondary mission is to provide users of this device with the capability to accurately aim rifle fire when the AN/PVS-3 is bracketed to the rifle.

2. Characteristics:

- a. Size: 12.5" $\times$ 2.75" $\times$ 5.5".
- b. Weight: 3 pounds.
- c. Crew: 1 man.
- d. Transport: Manportable in case.

3. References:

TM 11-5855-209-10
TM 11-5855-209-23
TM 11-5855-209-45P

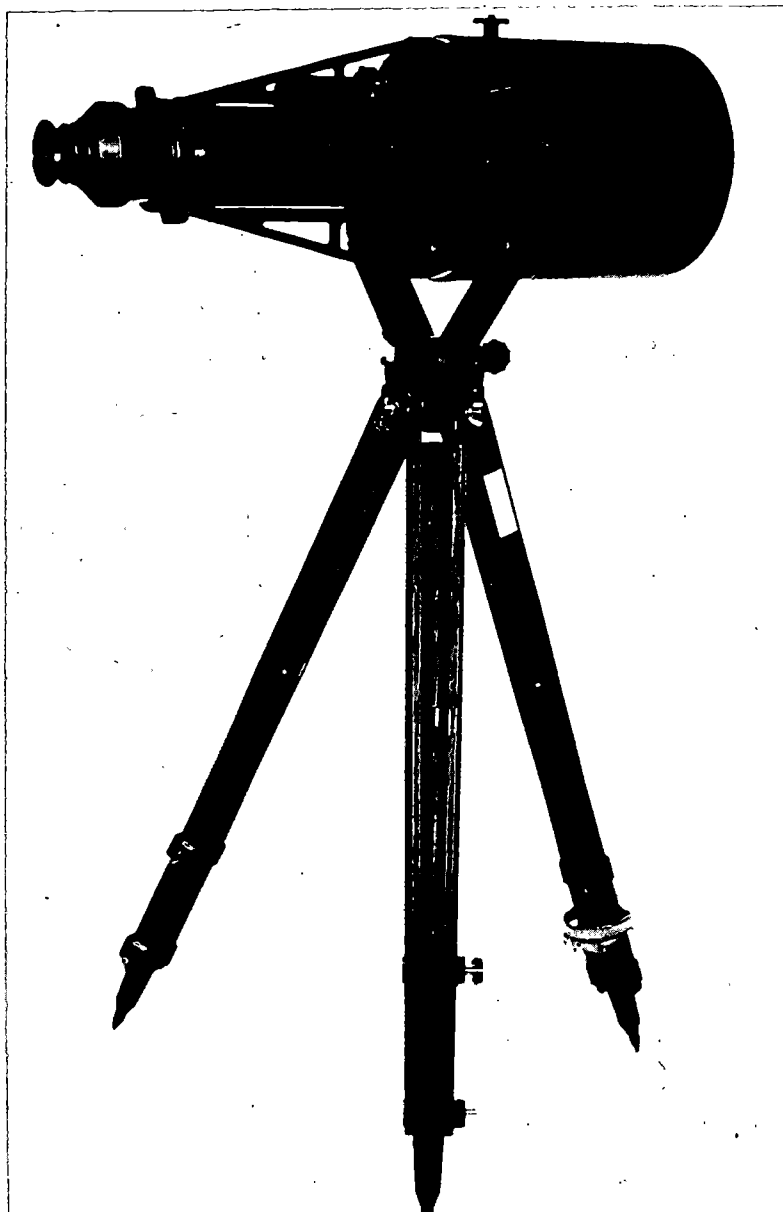


Figure B-12. AN/TVS-4, night observation device—medium range.

TAB 12

AN/TVS-4, Night Vision Sight, Tripod Mounted (Night Observation Device, Medium Range)**1. Description and Use:**

The AN/TVS-4 usually is emplaced on the best available vantage point overlooking the terrain of interest. Used for sector and perimeter defense. Can be used for fire control of artillery. The purpose is to observe terrain and detect objects of a tactical nature during periods of darkness. It utilizes starlight and moonlight for completely passive viewing. It enables individual soldiers on outposts, listening posts, forward observation posts, and patrols to detect, identify, and observe friendly or enemy elements and will be used as a general night vision aid. The device is tripod or vehicle mounted.

2. Characteristics:

- a. Size: 29" × 8.3".
- b. Weight: 34 pounds (viewer only, less tripod).
57 pounds (viewer in carrying case, less tripod).
- c. Crew: One man.
- d. Transport: Can be carried by one man in case; two men desired.
- e. Magnification: 7X.

3. References:

TM 11-5850-228-13
TM 11-5850-228-45P

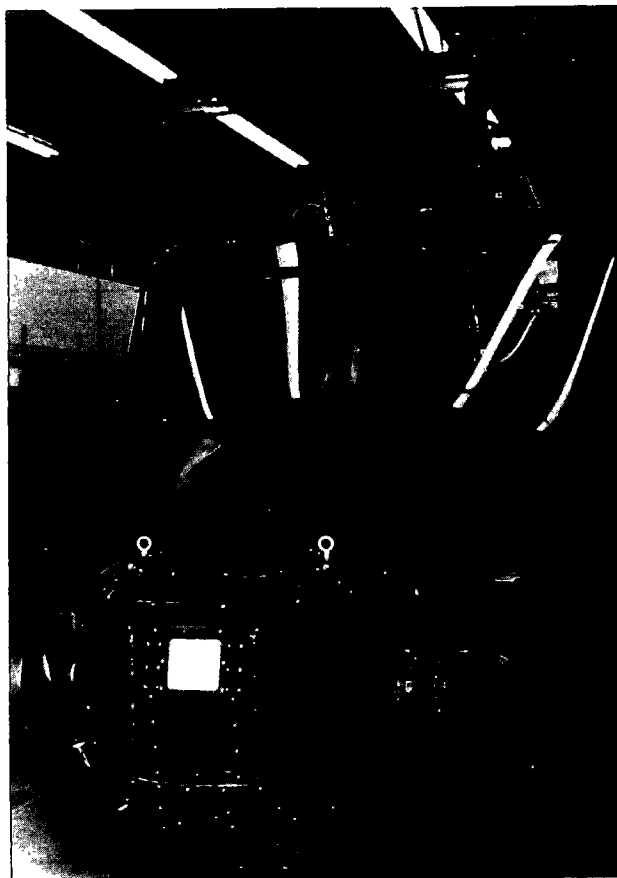


Figure B-13. AN/AAQ-5 FLIR.

TAB 13

Forward Looking Infrared (FLIR) System AN/AAQ-5

1. Description and Use:

To provide a night fighting capability for the helicopter. The Forward Looking Infrared (FLIR) Sensor will be used to aim the Weapons System at night when normal visual methods are not possible. The FLIR will be used as the night sensor in the target acquisition fire control missions. The FLIR sensor is mounted in a nose turret of the helicopter to provide a realtime television-type presentation of targets and terrain, both day and night. The infrared sensor will be boresighted with the aircraft weapon system, providing the crew with a dark-environment fire control capability. The system can also be used during daytime for acquisition of targets. The turret is movable in azimuth and elevation, and provides a wide or a magnified narrow field of view. Three displays are on board for viewing by the pilot, copilot gunner, and an observer.

2. Characteristics:

a. Displays: CRT, one circular 7-inch for pilot and one circular 8-inch for copilot; one circular 10-inch for observer.

b. Turret Weight: 265 lbs.

c. System Weight: 629 lbs.

3. References:

DTM 9-1270-211-14

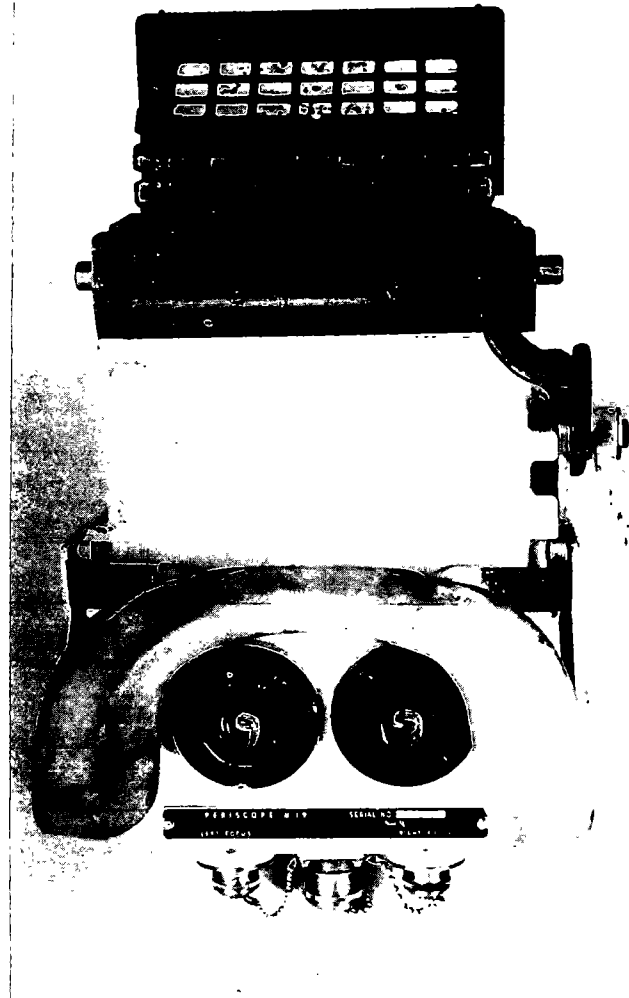


Figure B-14. Periscope, M19.

TAB 14**Periscope: M19****1. Description and Use:**

Night driving of armored vehicles. Infrared headlamps on vehicle "illuminate" the scene. Reflected infrared energy is converted to visible images and viewed through eyepieces. It is mounted in vehicle for use of driver with hatches closed. May be rotated horizontally and vertically and locked in place to optimize viewing position.

2. Characteristics:

- a.* Type: Binocular instrument with two image converter tubes.
- b.* Weight: 15 lb. 10 oz.
- c.* Power Source: External-vehicular.
- d.* Range: Best vision is approximately 18 yards.
- e.* Wavelength: Near infrared.
- f.* Display: Visual picture.
- g.* Magnification: Unity power.
- h.* Field of View: 26.8°.

3. References:

TM 9-6059

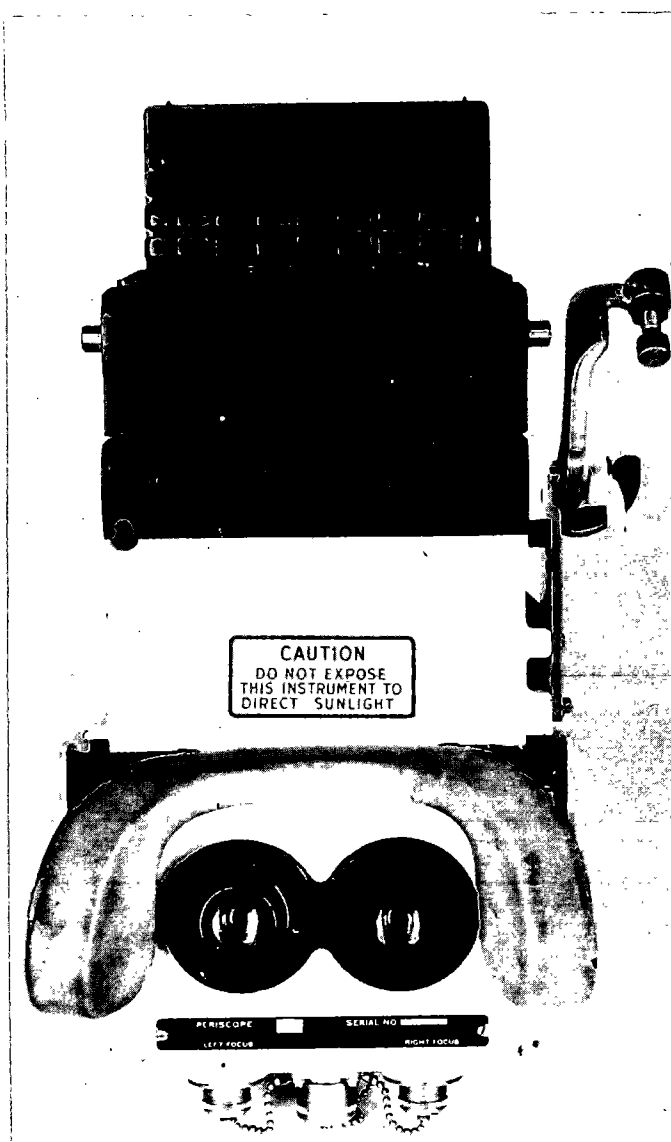


Figure B-15. Periscope, M-24.

TAB 15
Periscope: M24

1. Description and Use:

Night driving of armored vehicles. Infrared headlamps on vehicle "illuminate" the scene. Reflected infrared energy is converted to visible images and viewed through eyepieces. It is mounted in vehicle for use of driver with hatches closed. May be rotated horizontally and vertically and locked in place to optimize viewing position.

2. Characteristics:

- a.* Type: Binocular instrument with two image converter tubes.
- b.* Weight: 16 lbs.
- c.* Power Source: External-vehicular.
- d.* Range: Best vision is approximately 18 yards.
- e.* Wavelength: Near infrared.
- f.* Display: Visual picture.
- g.* Magnification: Unity power.
- h.* Field of View: 26.8°.

3. References:

TM 9-6059

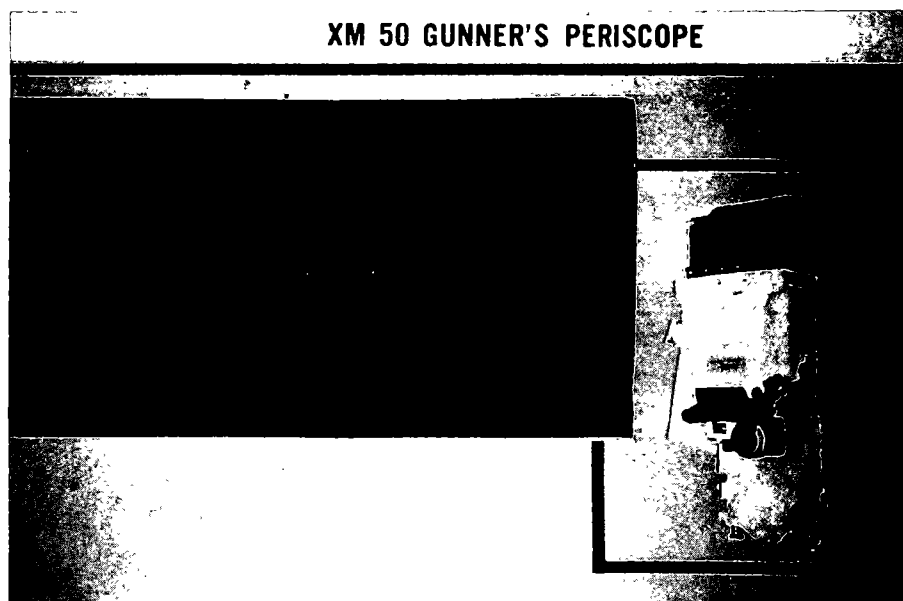


Figure B-16. Periscope, gunner's XM-50.

TAB 16

Periscope, Gunner's XM50

1. Description and Use:

Item is a major component of the fire control system of the M60A1E2 Main Battle Tank and serves as the primary fire control instrument for the conventional round for both day and night operations. Tank gunner aims his armament and laser rangefinder by centering reticle of periscope on target. Periscope is fixed in azimuth with respect to turret and is synchronized in elevation with respect to main gun.

2. Characteristics:

a. Type: Synchronized tank gunner's sight with optical daytime viewing system employing an image intensifier for nighttime viewing.

b. Weight: 75 pounds.

c. Power Source: Vehicle power-nominal 24 vdc.

d. Accuracy: $\pm .2$ mil in elevation $\pm .25$ mil in deflection.

e. Wavelength: Visible and near infrared.

f. Peak Power: N/A.

g. Average Power: 30 W (approx).

h. Display: Visual Display in eyepiece.

i. Crew: Tank Gunner.

j. Transport: Vehicle mounted.

3. References:

TM 9-1240-330-35

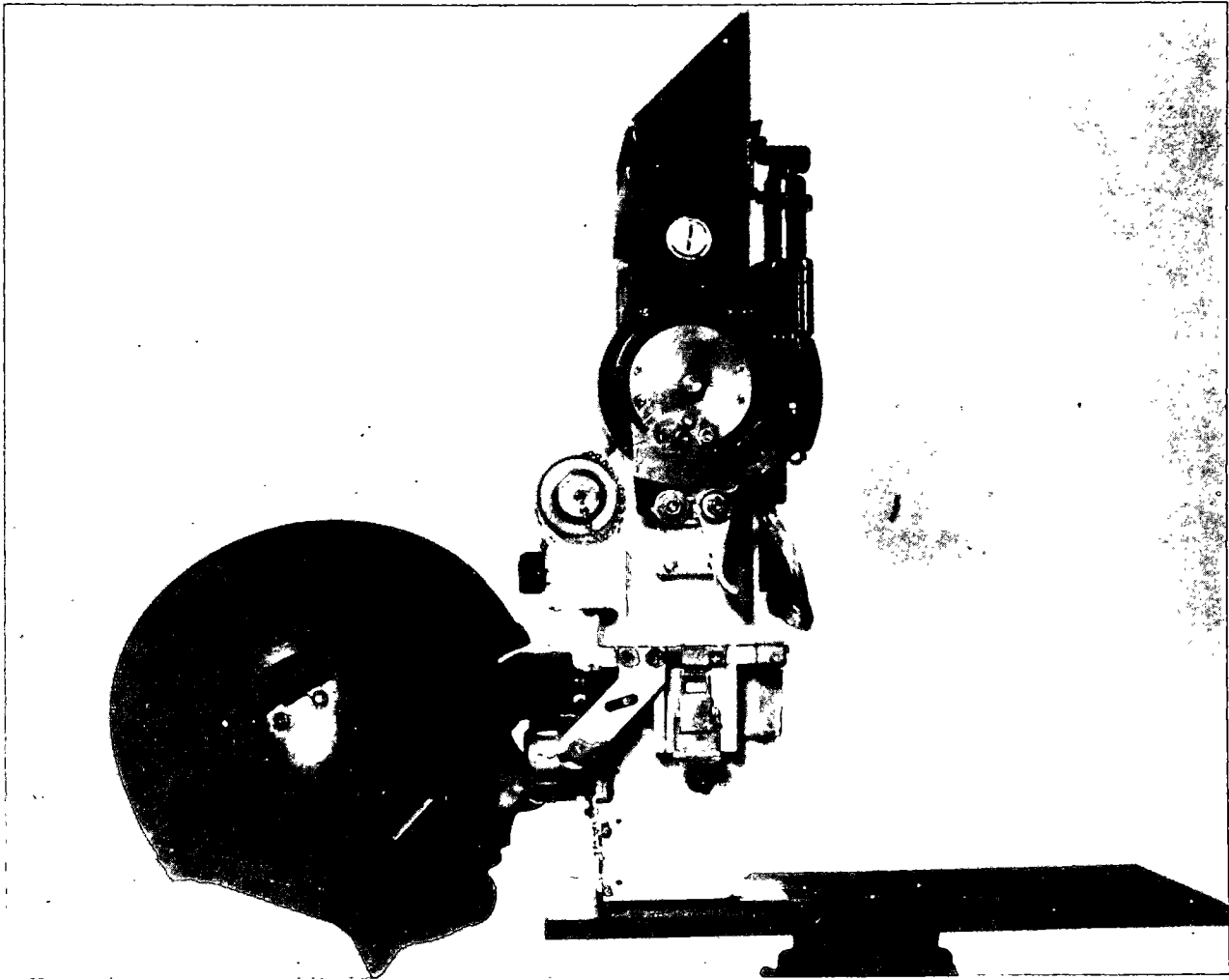


Figure B-17. Periscope, night vision, AN/VVS-2.

TAB 17

Periscope, Night Vision, AN/VVS-2

1. Description and Use:

As a night vision driving aid during close-hatch operations, it provides an image intensifier field of view to driver of an armored vehicle (when night vision goggles in conjunction with vehicular daylight periscope cannot be used) for purposes of general surveillance and or operation of vehicle without supplementary illumination. This item will be installed in an M-113 test bed for use in driving the vehicle at night, and to compare the device with the night vision goggles as a driving aid during closed-hatch operations without the aid of visible or near infrared light sources.

2. Characteristics:

- a.* Type: 25mm image intensifier (first generation—3-state)
- b.* FOV: 54°.
- c.* Magnification: 1X (unity).
- d.* Power Source: Small starlight scope battery.
- e.* Operating Time (Battery): 12 hours.
- f.* Display: Binocular.
- g.* Weight: 40 lbs.
- h.* Crew: N/A.
- i.* Transport: Carrying Case, Armored Personnel Carrier (APC) A-113.

3. References:

AMC STANO Catalog March 1970

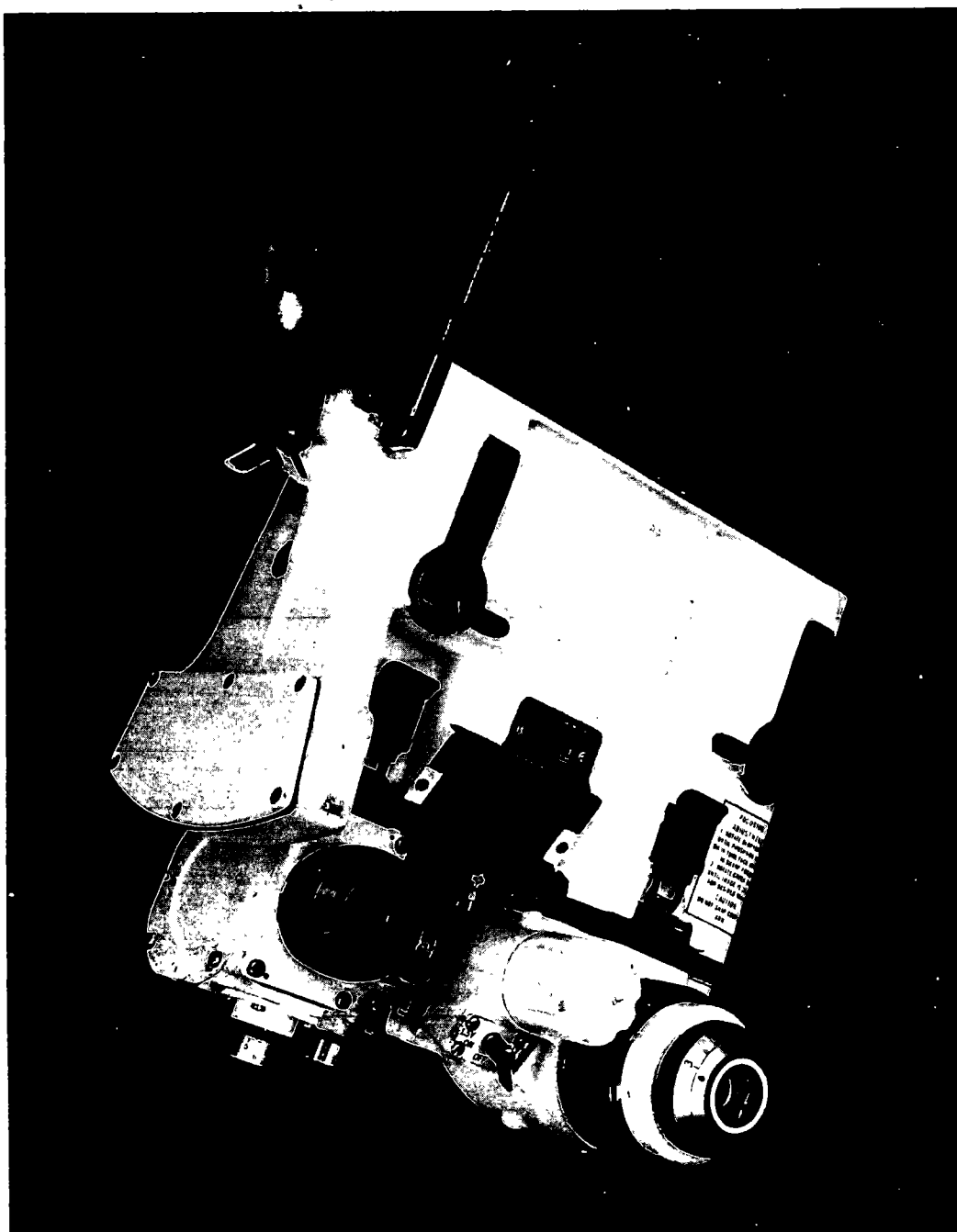


Figure B-18. Periscope, tank M32.

TAB 18
Periscope, Tank M32

1. Description and Use:

Primary mission is to provide the M60 tank gunner with two 8-power optical sighting systems for fire control of the 105mm main gun. One system is for daylight and the other, with the aid of a turret-mounted xenon searchlight, is for night operation. Secondary mission is to provide a unity power optical system for daylight observation and fire control of a 7.62mm machinegun coaxially mounted to the main gun.

2. Characteristics:

- a.* Type: 8-power infrared, 8-power daylight.
- b.* Weight: 52 lbs.
- c.* Power Source: 24-volt vehicle power. 1½ volt "C" cell battery may be used to energize image converter tube for infrared viewing.
- d.* Crew: Tank gunner.
- e.* Transport: Vehicle mounted.

3. References:

TM 9-1240-313-34

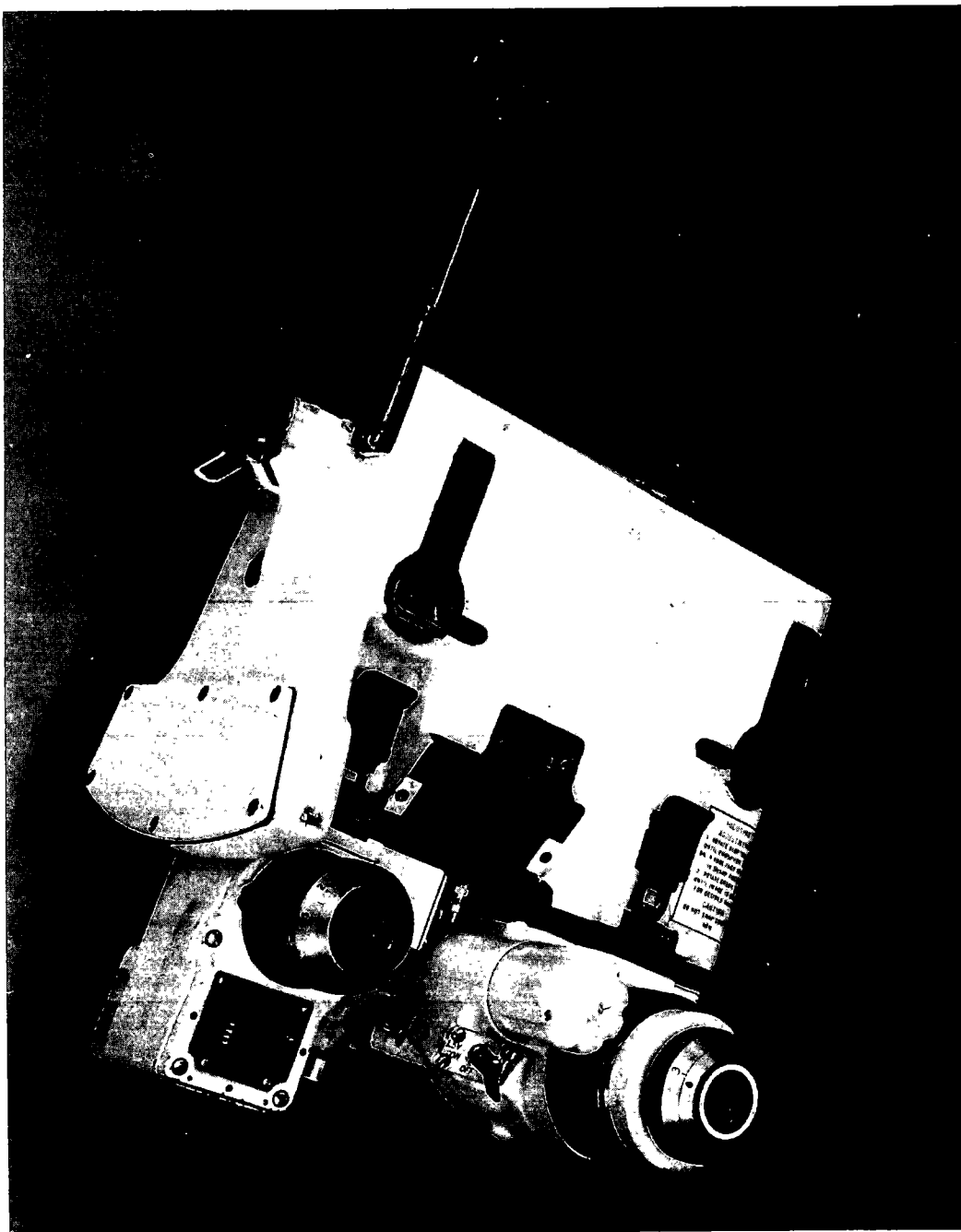


Figure B-19. Periscope, tank M35.

TAB 19
Periscope, Tank M35

1. Description and Use:

Primary mission is to provide the M60A1 tank gunner with two 8-power optical sighting systems for fire control of the 105mm main gun. One system is for daylight and the other, with the aid of a turret mounted xenon searchlight, is for night operation. Secondary mission is to provide unity power optical system for daylight observation and fire control of a 7.62mm machinegun coaxially mounted to the main gun.

2. Characteristics:

- a.* Type: 8-power infrared.
8-power daylight.
- b.* Weight: 52 pounds.
- c.* Power Source: 24-volt vehicle power. 1½ volt "C" cell battery may be used to energize image converter tube for infrared viewing.
- d.* Crew: Tank gunner.
- e.* Transport: Vehicle mounted.

3. References:

TM 9-1240-313-35P

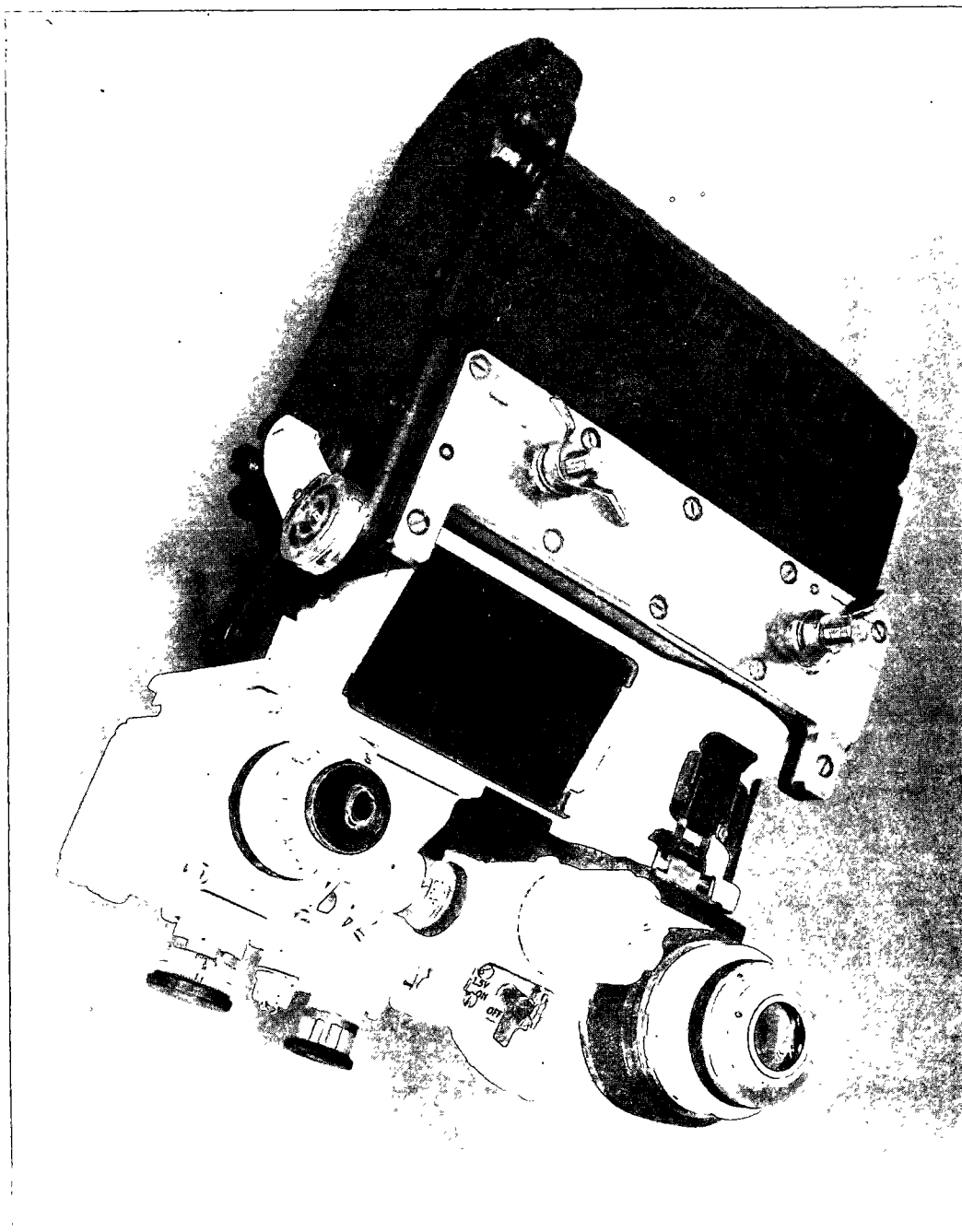


Figure B-20. Periscope, tank M36.

TAB 20
Periscope, Tank M36

1. Description and Use:

Primary mission is to provide the M60/M60A1 tank commander with two 8-power optical sighting systems for fire control of the cupola machinegun. One system is for daylight and the other, with the aid of a turret-mounted xenon searchlight, is for night operation. Control Light Source 8619159 is connected to vehicle power and provides 24 volts for energizing image converter tube through the converter regulator and 16 kv power supply. Vehicle turret permits 360° slewing with periscope.

2. Characteristics:

- a. Type: 8-power infrared, 8-power daylight.
- b. Weight: 50 lbs.
- c. Power Source: 24-volt vehicle power. 1½ volt "C" cell battery may be used to energize image converter tube for infrared viewing.
- d. Crew: Tank commander.
- e. Transport: Vehicle mounted.

3. References:

TM 9-1240-314-34

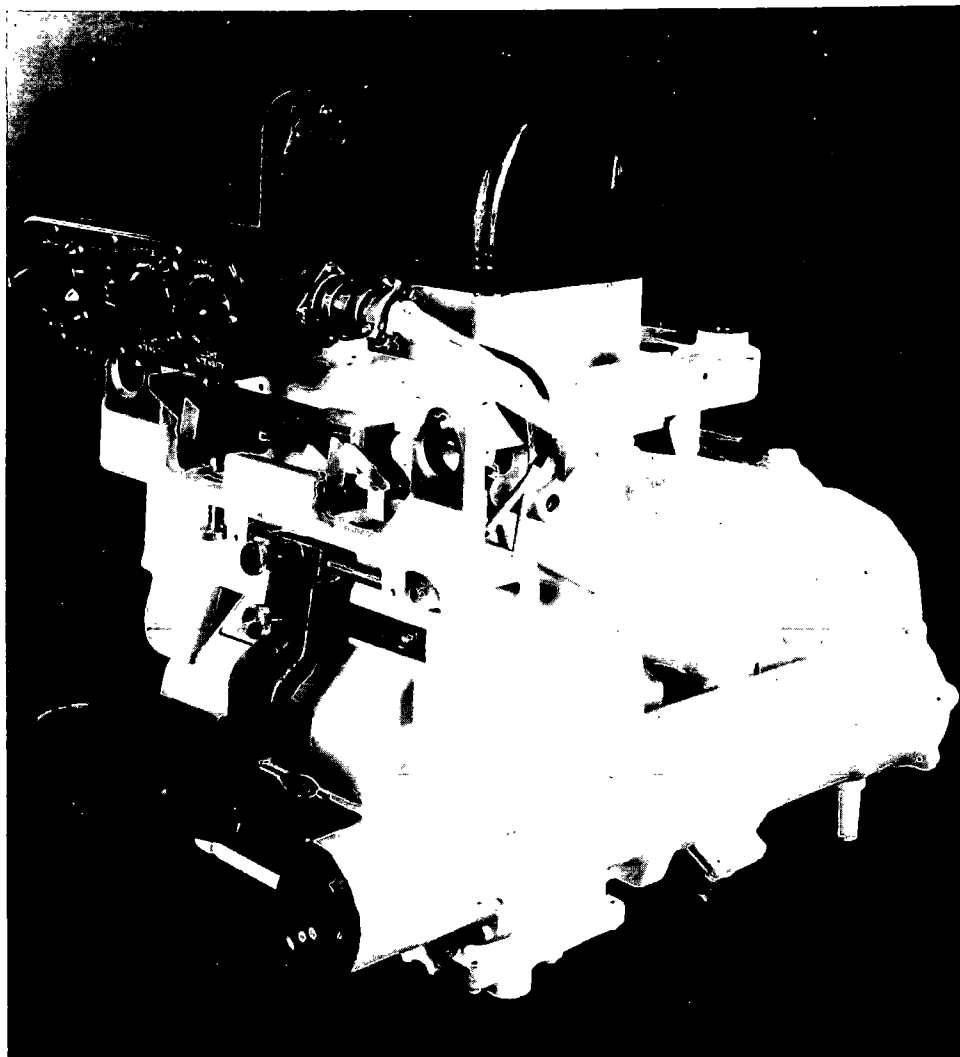


Figure B-21. Periscope, tank XM44E1.

TAB 21

Periscope, Tank: XM44E1

1. Description and Use:

The XM44E1 Periscope serves as the primary nighttime conventional-round, fire control instrument for the Sheridan M551 Vehicle. In addition, a unity power daylight viewing system is incorporated. The periscope is linked to the weapon by means of a parallelogram linkage. The articulated mirror in the head assembly provides for elevation and depression of the line of sight through $+20^{\circ}$ and -10° .

2. Characteristics:

a. The periscope comprises two assemblies, a head assembly and a body assembly. Support for the periscope is provided by a mount assembly attached in the turret on the right side of the gun, while electrical control is governed by a panel assembly located at the rear of the mount. Other equipment associated with the operation of the periscope include a washer and wiper assembly, a splash plate and head rest assembly, a boresight aid, a linkage assembly, and a battery assembly.

b. Optical characteristics of the night viewing system which utilizes three-stage image intensifier tube consisting of:

(1) Magnification: 9X.

(2) Field of View: 6° .

c. Weight: 175 lbs.

d. Size: Width 13.0 in., overall height 21.125 in., and maximum depth 20.5 in.

3. References:

TM 9-1240-309-35

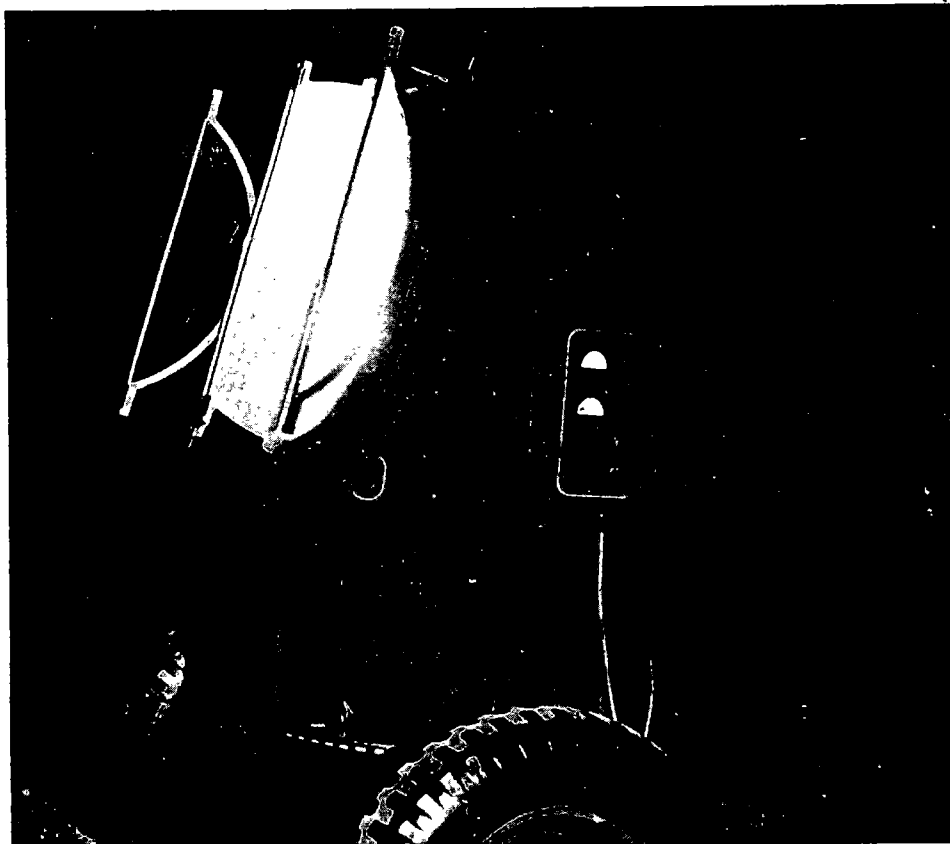


Figure B-22. AN/TVS-3, searchlight, 20 Kw.

TAB 22

AN/TVS-3, Searchlight, General Purpose, Xenon, 20 Kw**1. Description and Use:**

The purpose is to provide a searchlight for battlefield illumination, for sector or perimeter defense, and for control of artillery. An infrared (IR) capability is also provided which will permit its covert use with night vision viewing devices. Options available include: Emplace the searchlight on the best available vantage point for direct illumination of the terrain of interest or indirect illumination by reflection from cloud overcast; use for sector or perimeter defense; utilize for control of artillery; utilize in IR mode with viewing devices for covert observation with potential of quick shift to visible light to permit supporting troops without viewing devices to bring fire power into play. Searchlight can be located up to 100 feet from the generator/power source for minimum radio frequency interference.

2. Characteristics:

- a. Size 78" × 66" × 54" (approx).
- b. Weight: 1200 pounds (approx).
- c. Crew: 2 men.
- d. Transport: Self-contained on integral two-wheeled trailer.

3. References:

TM 11-6230-220-35
TM 11-6230-220-12



Figure B-23. AN/USS-6 searchlight, handheld.

TAB 23

Searchlight, Handheld, 28V DC, Under 10 Amps, 280W, AN/USS-6**1. Description and Use:**

Provide a small portable searchlight for battlefield short-range surveillance by the tank commander. This invisible light source will be employed by the combat vehicle commander to raise the light level sufficiently to permit the Night Vision Binocular to be used to detect and recognize targets at extended ranges under heavy overcast conditions. It will be used during both mounted and dismounted operations.

2. Characteristics:

- a. Type: Manportable.
- b. Weight: 5 lbs.
- c. Power Source: Vehicular.
- d. Crew: 1 man.
- e. Transport: Manportable.

3. References:

AMC STANO Catalog March 1970

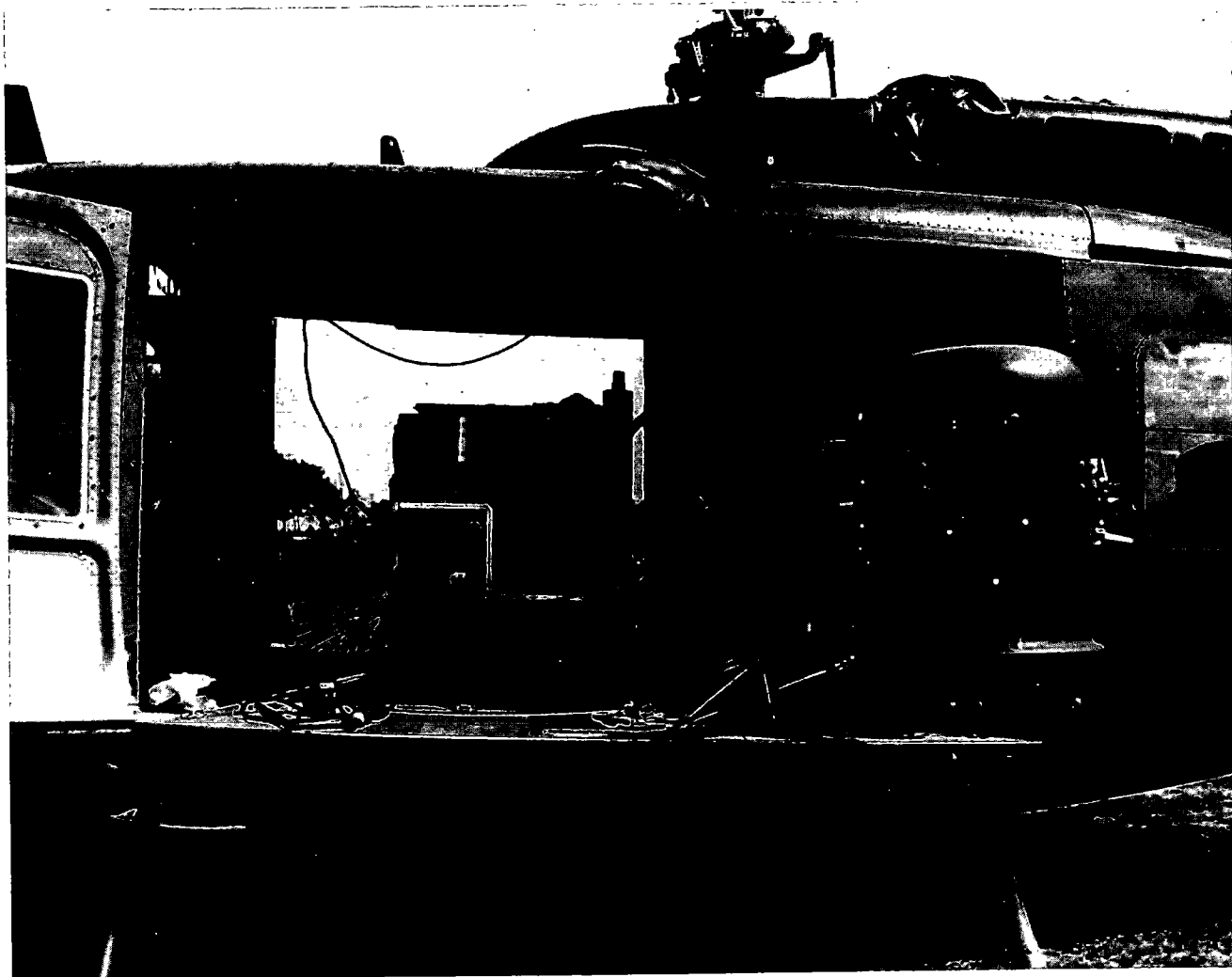


Figure B-24. AN/ASS-2, airborne searchlight system.

TAB 24

Airborne Searchlight System AN/ASS-2

1. Description and Use:

A helicopter device to provide large battlefield area illumination at several times moonlight level at extended altitudes. This system will be employed to provide illumination of areas to assist maneuver elements in the conduct of offensive, defensive, and security operations. It will be used to provide illumination of landing zones for the conduct of airmobile operations, and to facilitate the employment of armed helicopters and other aerial fire support means. Proper use of the airborne searchlight can extend the range of aerial and ground passive night vision devices by increasing the ambient light level.

2. Characteristics:

- a. Type: Airborne searchlight.
- b. Weight: 1200 lbs.
- c. Power Source: Turbine-alternator package.
- d. Crew: One operator and aircraft crew.
- e. Transport: UH-1 aircraft.

3. References:

AMC STANO Catalog March 1970

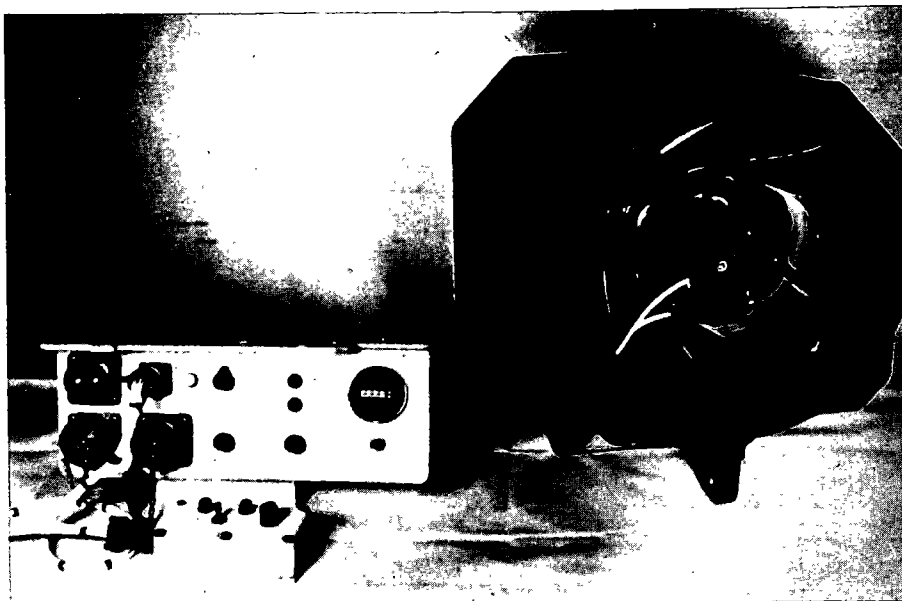


Figure B-25. AN/VSS-3, searchlight, 1 Kw.

TAB 25

AN/VSS-3, Searchlight, (SLT) Infrared (1 Kw)

1. Description and Use:

To provide a visible or infrared (IR) light assist for use on M551 (Sheridan) M113 (APC) and other potential future uses including tanks, combat vehicles, troop carriers, helicopters, jeeps, towers, etc. Uses extend from providing perimeter and battlefield illumination (visible mode), to extending the range of infrared and passive viewers (IR). When M551 (Sheridan) mounted, the SLT is part of a night vision kit which includes active and passive periscopes as well as the AN/PVS-2, Night Vision Sight, Individual Served Weapon (Starlight Scope) normally bracketed to the M50 machinegun atop the M551. Its use on helicopters is planned in conjunction with the AN/TVS-4, Night Vision Sight, Tripod Mounted (Medium Range) and appropriate armament. Detailed methods of employment with other weapon systems have not been established. It can be used in the pink IR mode or visible light mode with a capability of rapid switch from IR to visible mode. The rapid switch is extremely important when an enemy movement is tracked with IR viewing devices and the moment comes to illuminate the target for the benefit of troops not equipped with viewing devices.

2. Characteristics:

- a. Size: 15" × 15" × 18".
- b. Weight: 75 pounds.
- c. Power Source: Vehicle with a 28 volt dc, 50 amp capacity.
- d. Crew: One man (vehicle commander).
- e. Transport: Mounted and stowed on using vehicle.

3. References:

TM 11-5855-217-12
TM 11-5855-217-35

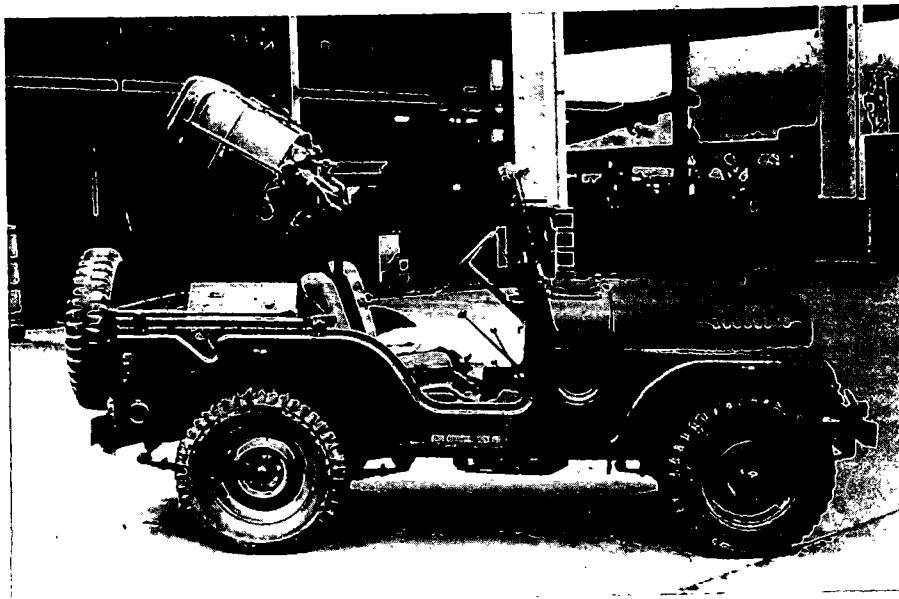


Figure B-26. Searchlight, IR, 2.2 Kw.

TAB 26

Searchlight, Xenon, Infrared, 2.2 Kw

1. Description and Use:

To provide a visible or infrared (IR) light assist for the troops equipped with M60 series or M48A3 tanks, modified 1/4-ton trucks (jeeps), helicopters, or towers. Uses extend from providing perimeter and battlefield illumination (visible mode) to extending the range of infrared and passive viewers (IR), and tracking and firing on targets (visible or IR). When tank mounted, the searchlight is part of a night vision kit which includes also the following four near infrared devices: Metascope; M18 Binoculars; Gunners Periscope; Commanders Periscope. The searchlight is controlled from inside the tank and may be switched rapidly from IR to visible light mode. When jeep mounted, the searchlight has great mobility and can also be switched rapidly from IR to visible mode. The rapid switch is extremely important when an enemy movement is tracked with IR viewing devices and the moment comes to illuminate the target for the benefit of troops not equipped with IR viewing devices. A limited number of helicopter-mounted SLT were evaluated, with one helicopter carrying the SLT, and others zeroing in on visibly-lighted targets with armament. Tower-mounted lights are used for perimeter lighting. The seven versions of the 2.2 Kw Searchlight are identified as follows:

<i>Near IR</i>	<i>Use</i>	<i>Pink IR</i>
AN/VSS-1	Tank Mount	AN/VSS-2
AN/GSS-14	Pedestal Mounted for Jeep or Tower	AN/GSS-18
AN/MSS-3	Jeep Mounted	AN/MSS-4
AN/ASS-1	Helicopter Mount	

2. Characteristics:

- a. Size: $20\frac{1}{2}'' \times 30\frac{3}{4}'' \times 31\frac{1}{2}''$
- b. Weight: 230 pounds.
- c. Power Source: A 28-volt dc, 100-amp system (powered by using vehicle).
- d. Transport: Mounted on using vehicle.

3. References:

AMC STANO Catalog March 1970

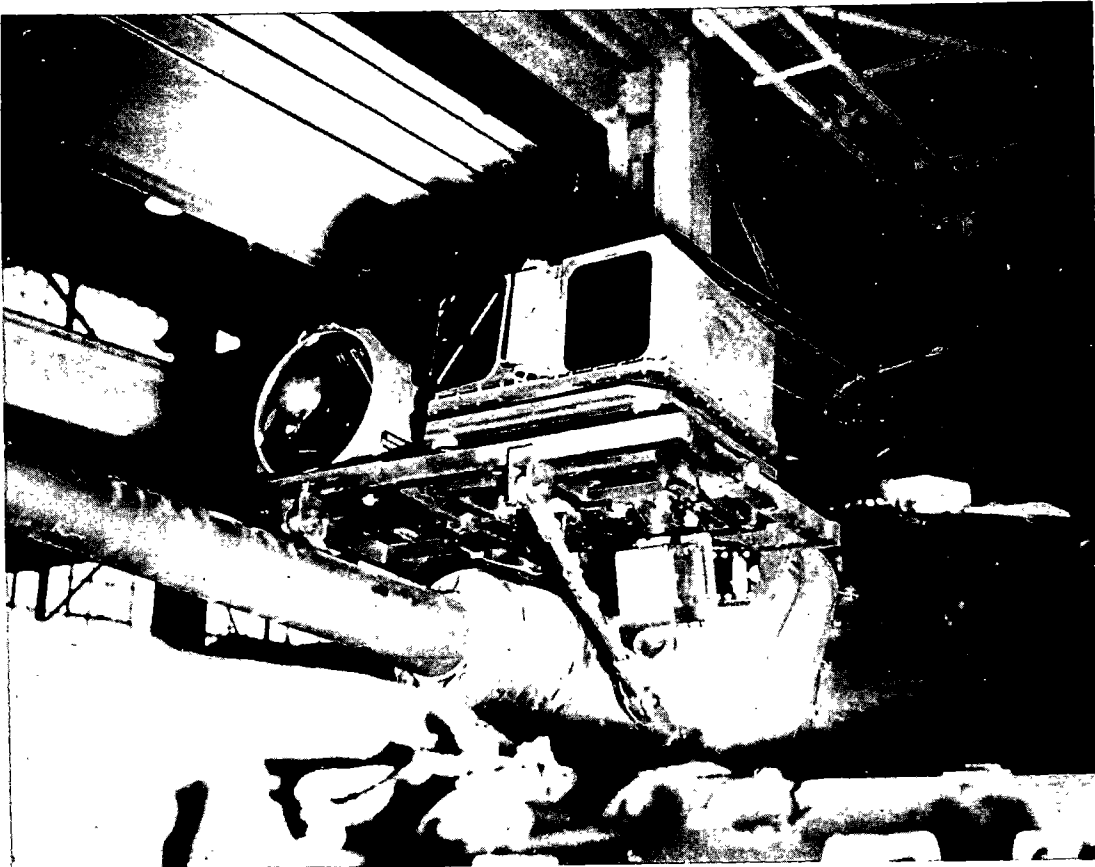


Figure B-27. AN/VAS-1 FIRT I.

TAB 27

AN/VAS-1, Surveillance Set, Infrared, Far Infrared Target Indicator (FIRTI)**1. Description and Use:**

The mission of the AN/VAS-1, Surveillance Set, Infrared (Target Indicator) is to provide tanks and combat vehicles with a far infrared imaging system capable of detecting a vehicular target. The collecting optics, scanning optics, and infrared detector array (with cooler) are housed and mounted externally on the vehicle. The display units and associated electronics are mounted inside the vehicle. Targets are shown on the display as images. The image display unit indicates both the azimuth and elevation of the target background. Use of this device will improve the capability of the tank/combat vehicle commander to perform his mission.

2. Characteristics:

- a. Size: Outside scan-head-10" $\times$ 15" $\times$ 17".
- b. Weight: Scan-head-120 pounds/displays, 15 pounds each.
- c. Power Source: Vehicle powered.
- d. Crew: Operated by crew of vehicle. Two displays for vehicle commander and gunner.
- e. Transport: Transported and stowed on vehicle.

3. References:

AMC STANO Catalog March 1970



Figure B-28. AN/PAS-7, viewer, infrared.

TAB 28

Viewer, Infrared, AN/PAS-7 ()

1. Description and Use:

Provide a handheld thermal detection and imaging device for nighttime use to detect and recognize personnel targets at short ranges. The collected infrared radiation is converted to a visible image of the background scene and target objects. The image displayed indicates relative azimuth and elevation. This viewer will be of particular benefit to patrols for ambush detection, and will be employed by squad and fire team leaders when the ambient light is insufficient to permit the functioning of intensification-type devices.

2. Characteristics:

- a. Type: Handheld/manportable, thermal, viewing device.
- b. Weight: 5.8 pounds (viewer).
- c. Power Source: Battery, 4.9 pounds (throw away).
- d. Display: 3-objective lens is parallel.
- e. Crew: 1 man.
- f. Transport: Manportable.
- g. Sector Scan: 6° vertical by 12° horizontal.

3. References:

AMC STANO Catalog March 1970

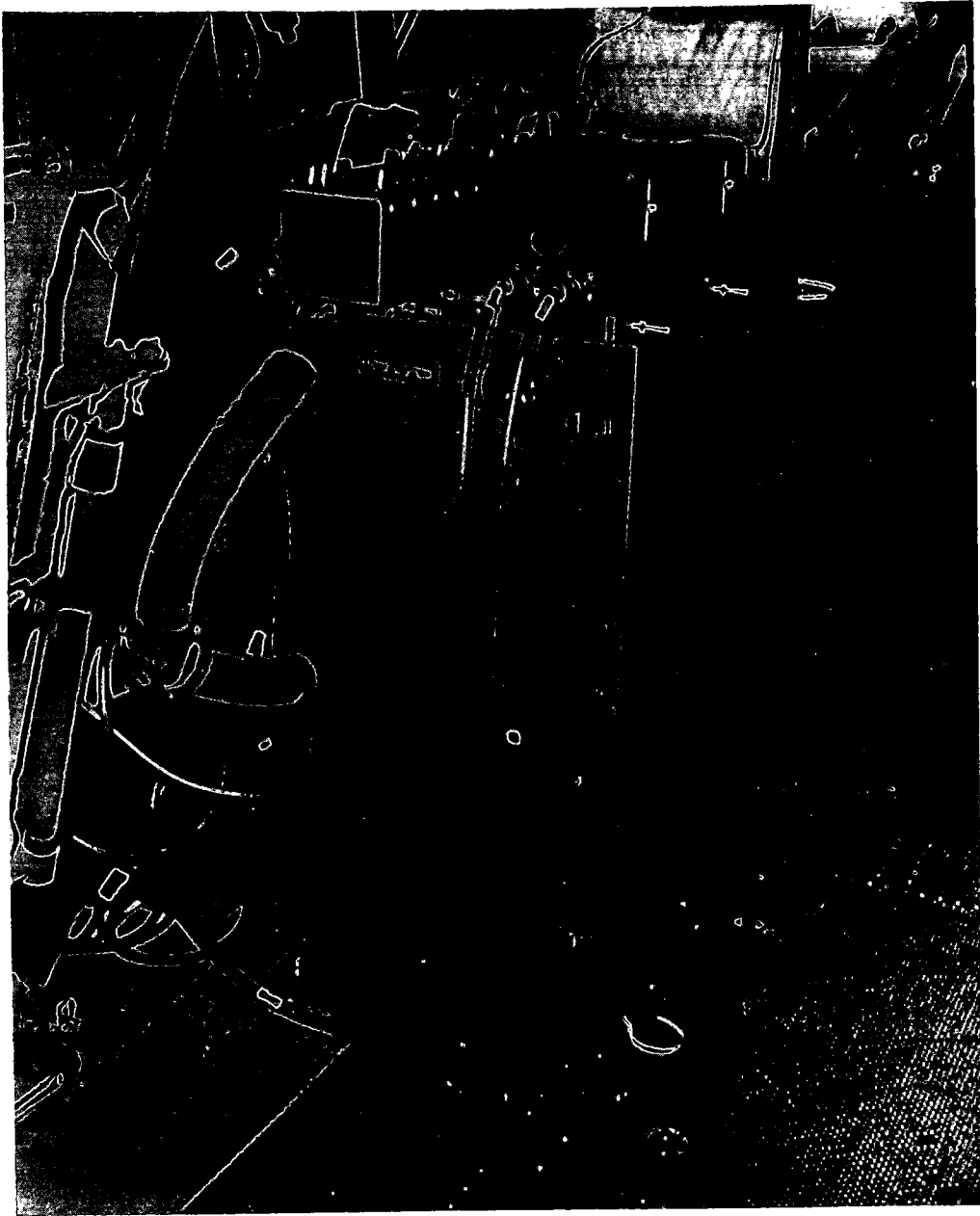


Figure B-29. Detector, concealed personnel, XM3.

TAB 29

Detector, Concealed Personnel; Aircraft-Mounted, XM3**1. Description and Use:**

The XM3 Personnel Detector is an electronic device that is mounted internally in a UH-1 helicopter. A single-mounted pilot's indicator with two meters, an oscillograph, an electrical distribution box, interconnecting cables, airscoop and associated air duct hosing, and installation components complete the items needed for operation. The base plate mounts on the aircraft structure directly behind the forward cabin. The top surface of the detector housing includes mounting brackets to which observer's control boxes and the oscillograph are attached. The XM3 detector is operated by one man. The XM3 detector is arranged to provide two identical detection modules. This redundant system is essential to provide adequate reliability by distinguishing between actual detections and noise signals that might be generated. The output of each module is proportional to background condensation nuclei in the air sample. The air is sampled from the air inlet box. The detector output signal is supplied to, and displayed on, the oscillograph, the observer's control box meters, and the pilot's indicator. The XM3 detector weighs approximately 98 lbs and is approximately 4 cubic feet in size. A minimum of 3 helicopters is recommended and they are employed as follows:

2. Characteristics:

a. One UH-1 helicopter (detector ship—carries the personnel detector, detector operator, and an observer. The flight search pattern normally is flown in a crosswind S-shaped pattern, moving from the downwind side of the search area to the upwind side.

b. One gunship flies 200-800 meters behind and slightly higher than the detector ship. This ship provides fire support cover for the detector ship.

c. Another gunship flies above and behind the detector ship. This ship acts as navigator and radar relay for the detector ship and provides additional cover if the detector ship is fired upon.

3. References:

TM 3-6665-267-12

TM 3-6665-267-35

TM 3-6665-272-14

TM 3-6665-267-20P

TM 3-6665-267-35P



Figure B-30. Helicopter, OH-6A.

TAB 30

Helicopter, OH-6A

1. Description and Use:

The LOH will be utilized to perform visual observation, target acquisition, armed reconnaissance (scout), command and control-type missions under tactical conditions. The purpose of the aircraft is to provide an inexpensive, reliable, easily maintainable helicopter, capable of providing for the performance of the primary tactical missions of visual observation, target acquisition, reconnaissance, and command control. It will have the capability of performing the secondary mission of providing airmobile security. The aircraft is to be organic to division, battalion, or equivalent level, and will be capable of essentially continuous operation in forward areas with maximum availability to the tactical commander. Ease of maintenance is a primary feature with the aircraft being expected to operate for extended periods, with only such support as may be provided by one mechanic with hand tools.

2. Characteristics:

a. It is single-lifting, 4-blade rotor, 4-place helicopter with a normal gross weight of 2400 pounds. It incorporates dual flight controls with the secondary cyclic control element easily removable. The flight instruments are limited to those required for day and night marginal visual conditions. The cargo area contains troop-type seats which are easily stowable when not in use.

b. Crew: Pilot and copilot/observer; two passengers—rear.

c. Dimensions:

- (1) Overall Length: 30'4".
- (2) Overall Height: 8'6".
- (3) Main Rotor Diameter: 26'4".

d. Weight:

	<i>Observation</i>	<i>Scout</i>
(1) Empty Weight:	1299 lbs	1229 lbs
(2) Useful Load:	1140 lbs	1171 lbs
(3) Gross Weight:	2439 lbs	2400 lbs

3. References:

TM 55-1520-214-10
 TM 55-1520-214-20 and 20P
 TM 55-1520-214-35 and 34P



Figure B-31. MOHAWK OV-1D.

TAB 31
Mohawk, OV-1D

1. Description and Use:

To provide the Army an organic means of day and night surveillance over friendly and enemy territory by means of visual, photographic, radar, and IR data. It is two-place, twin-turbo prop midwing aircraft with a short unimproved field take off and landing capability. It is a product improved Mohawk combining the capabilities of the OV-1A, B, and C aircraft into one airframe. The OV-1D contains the following improved or additional electronic equipments (or complete provisions for) over that installed in OV-1B or OV-1C aircraft:

2. Characteristics:

- a. Radar Warning Set AN/APR-25/26.
- b. Radar Jammer AN/ALQ-80 (complete provisions).
- c. SLAR AN/APS-94D (complete provisions)
- d. IR AN/AAS-24 (complete provisions) } Either set but not both.
- e. Cameras: Two KA-60C (complete provisions), one vertical and one horizontal mounted; one KA-76A.
- f. Data Annotation: AN/AYA-10.

The method of employment depends on the nature of the enemy's defenses. If the Mohawk were unopposed, it would be operated so as to optimize sensor coverage. Two basic methods of operation have been developed to employ the OV-1 Mohawk, as follows:

- g. STAND-OFF Operation, wherein the aircraft is operated at some distance behind FEBA looking across the enemy area.
- h. LOW-LEVEL VERIFICATION Operation, wherein the aircraft will cross the FEBA and operate within the enemy area.

3. References:

- TM 11-1510-204-20-2/1, 2/2
- TM 11-1510-204-35-2/1, 2/2



Figure B-32. SMASH.

TAB 32

Southeast Asia Multisensor Armament System for Huey Cobra (SMASH)

1. Description and Use:

The primary mission is for an AH-1G helicopter with improved armament, capable of providing close fire support, armed reconnaissance and security, and enroute armed escort both during daytime and periods of poor visibility. The system is to provide significant improvement in fire control accuracy.

2. Characteristics:

a. The system incorporates a Moving Target Indicating Radar Pod, on the right outboard wing station. A Forward Looking Infrared (FLIR) unit is mounted on the nose. The Armament Subsystem is incorporated, which has a 20mm, 6-barrel weapon mounted at the left inboard wing station.

b. The FLIR system utilizes passive infrared techniques, and the radar system is an externally coherent pulse doppler type.

3. References:

TM 3-6665-267-12
TM 3-6665-267-35
TM 3-6665-272-14
TM 3-6665-267-20P
TM 3-6665-267-35P

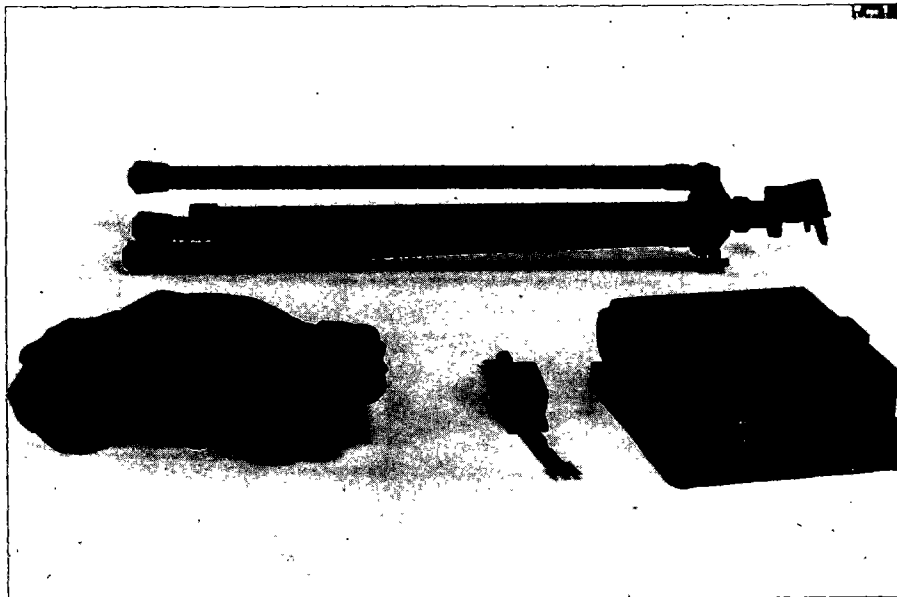


Figure B-33. AN/PPS-14 LPSD.

TAB 33

Listening Post Surveillance Device AN/PPS-14

1. Description and Use:

A small, lightweight, man-carried surveillance device capable of announcing the presence of intruders before they are detectable by the unaided senses of friendly personnel responsible for perimeter defense of mobile units.

2. Characteristics:

- a. Weight: Less than 7 pounds.
- b. Mode: Fopen Radar.
- c. Power: BA-1100.

3. References:

AMC STANO Catalog March 1970

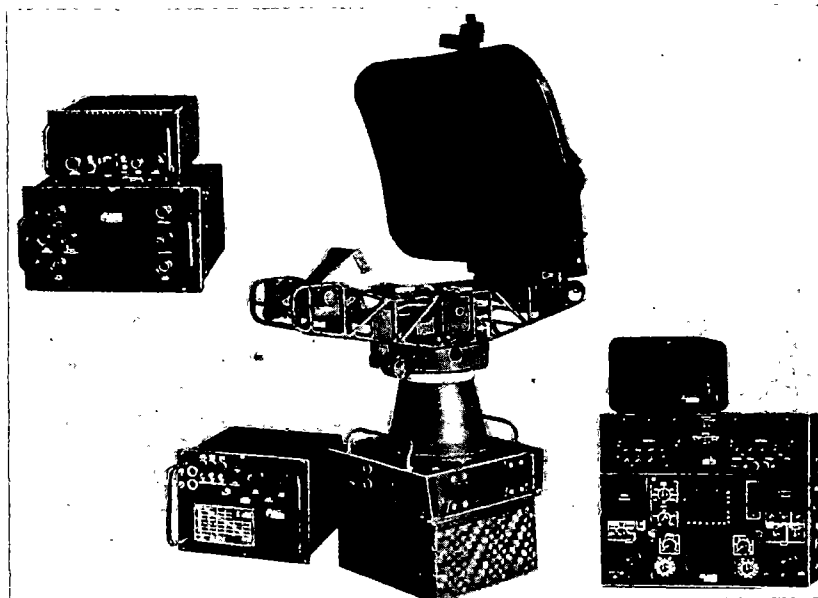


Figure B-34. AN/TPS-58 RATAAC.

TAB 34

Moving Target Location System (RATAC) AN/TPS-58

1. Description and Use:

To provide detection and location data on moving targets as well as predicted future position data on moving targets. The system will also be capable of sensing the burst of friendly cannon, rocket, and mortar fires with relation to the target and provide data that will permit the adjustment of fire on the target. The system will be operable, either mounted on a standard military wheeled or tracked vehicle, or with the sensor component remotored up to 100 meters from the vehicle. One Moving Target Location System will be organic to and employed by field artillery direct support battalions of all type divisions and separate brigades.

2. Characteristics:

a. Weight: The complete system weight will not increase the vehicle's weight by more than 1500 lbs including power source.

b. Probability of Detection : 85 percent.

c. Presentation: Visual target display of targets detected in selected area of interest. Automatic indication on a 1:50,000 meter military map of the location of target and future predicted location of target. Target locations printed in UTM coordinates on hard copy.

d. Operator Shelter : S-250 type.

e. Crew: Five men to transport and operate the radar.

3. References:

AMC STANO Catalog March 1970



Figure B-35. Radar set AN/MPQ-4A.

TAB 35

Radar Set AN/MPQ-4A

1. Description and Use:

Primary mission is to determine the location of hidden enemy mortars or low-velocity artillery pieces. Secondary mission is to determine the impact point of friendly mortar fire. The radar will be organic to direct support field artillery battalions, infantry, mechanized, air-mobile and airborne divisions and separate brigades. The control-indicator unit can be located up to 150 feet from the antenna assembly, in a foxhole or bunker to increase operator comfort and safety. The scan sector is set up to cover the area of interest.

2. Characteristics:

- a. Type: Ground weapon location radar.
- b. Weight: 7750 lbs.
- c. Power Source: Gasoline Engine Generator Set PU-304A, 208 Vac, 400 cps, 15 w.
- d. Crew: 4 men.
- e. Transport: 2 tactical 2½-ton vehicles.

3. References:

- TM 11-1367
- TM 11-5840-208-10
- TM 11-5840-208-20 and 20P
- TM 11-5840-208-35P
- TM 11-5840-208-30
- TM 11-5840-208-45

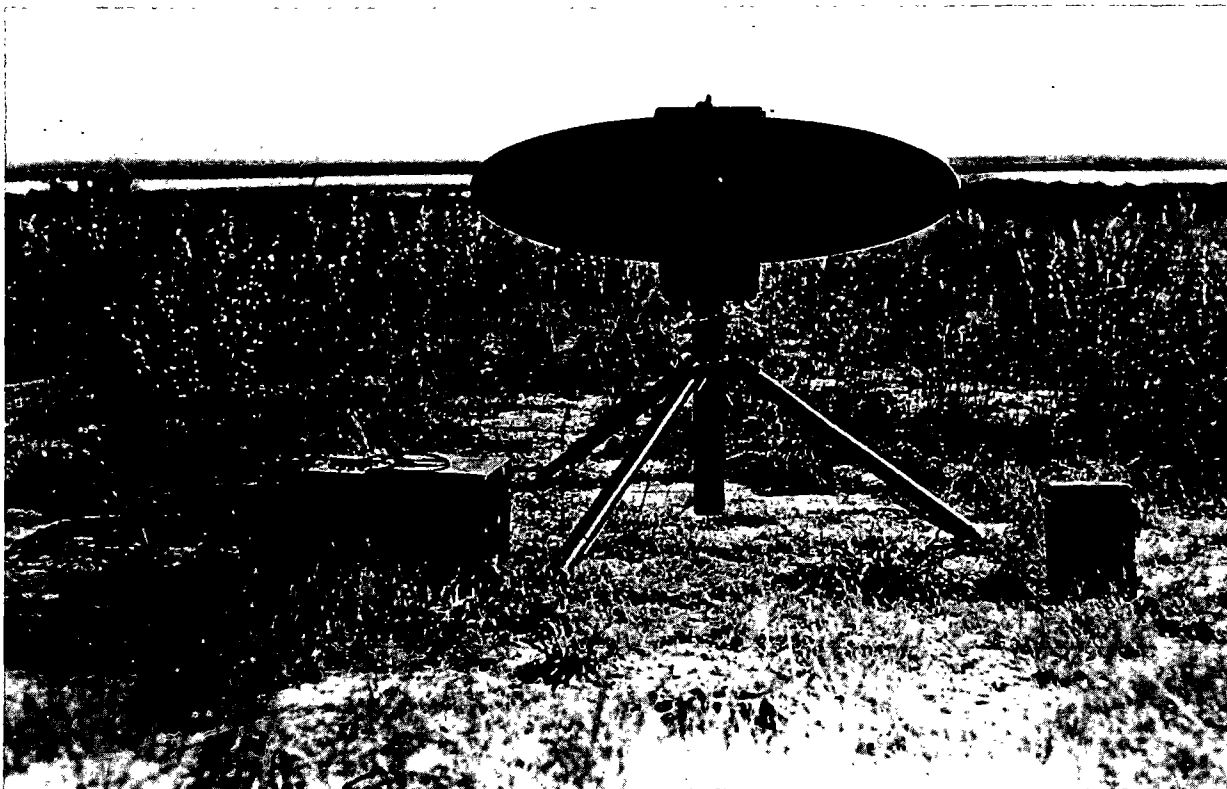


Figure B-36. Radar set AN/PPS-5.

TAB 36
Radar Set, AN/PPS-5

1. Description and Use:

Primary mission is to detect, locate, and identify moving ground targets such as personnel and vehicles with sufficient accuracy to produce meaningful combat intelligence. Secondary mission is to locate targets with sufficient accuracy to permit accurate fire by crew-served weapons such as mortars. The radar set is emplaced on the best available vantage point overlooking the terrain of interest. The control-indicator unit can be located up to 50 feet from the radio transmitter unit, in a foxhole or bunker to increase operator comfort and safety. The scan sector is set up to cover the area of interest, and the set is placed in automatic scan. The target can be located accurately and identified by stopping the antenna scan, "search-lighting" the antenna on the target, and centering the movable range gate on the target. The azimuth and range can be read directly in mils and meters from digital counters on the RT or control-indicator unit. The audio output contains the doppler frequency of the moving target. The audio output from different classes of targets (e.g., groups of personnel, wheeled and tracked vehicles) can be distinguished.

2. Characteristics:

- a. Type: Ground-to-ground, noncoherent, pulse-doppler, MTI radar.
- b. Weight: 95 lbs.
- c. Power Source: Self-contained battery (BB-622/U) or external 24-volt engine-generator or vehicle battery.
- d. Crew: 2 men.
- e. Transport: Vehicle or manpack. Three men required for manpack.

3. References:

TM 11-5840-298-12
TM 11-5840-298-35
TM 11-5840-298-35P

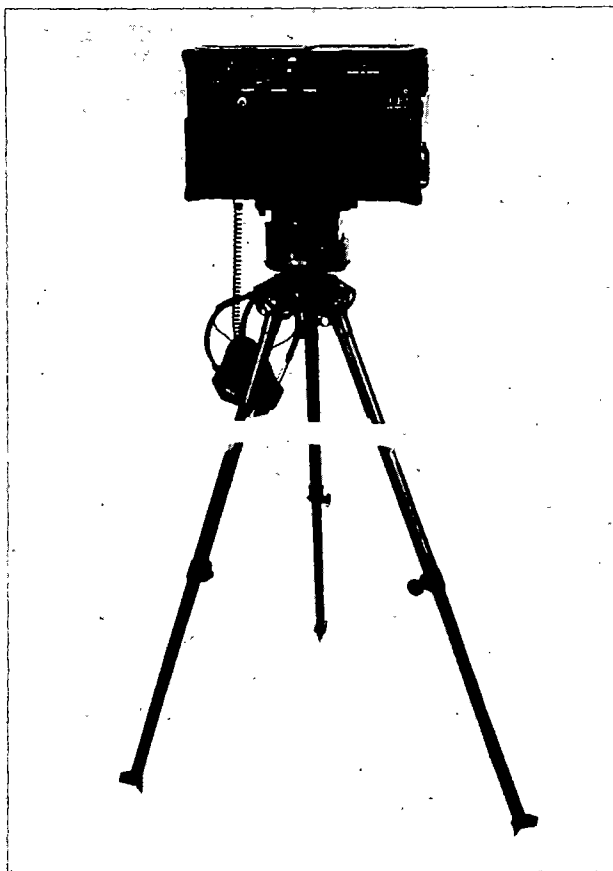


Figure B-37. Radar set AN/PPS-9.

TAB 37
Radar Set, AN/PPS-9

1. Description and Use:

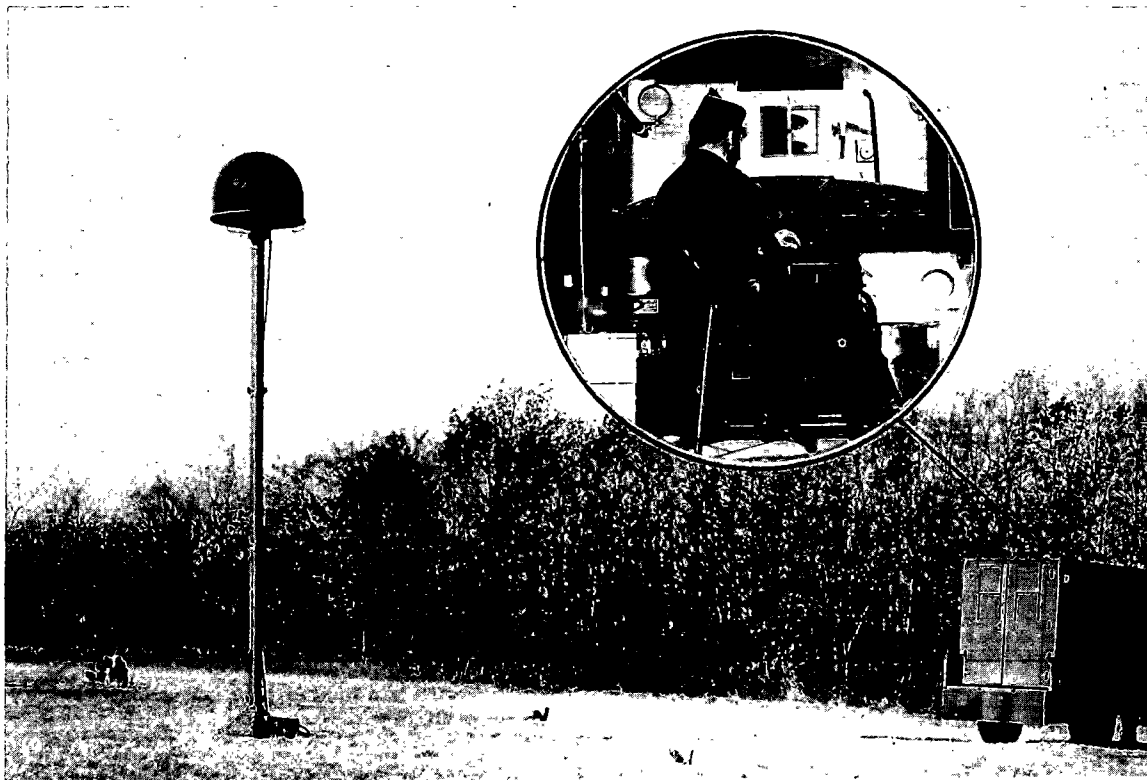
The primary objective of the equipment is to detect, recognize, and locate moving targets with sufficient resolution to produce combat intelligence. Secondary objective is to locate moving targets with sufficient accuracy to permit fire by light field weapons. The radar set in manpack condition will be carried by one man. The radar set can be operated from a tripod, placed on a rock, or held by the operators. In the tripod mode, the radar set is adjusted to cover the region of interest in automatic scan. Moving targets will be heard in the headset or seen on the meter. A moving target is located accurately by stopping the antenna scan and "searchlighted" by moving the range crank in the fine range mode until optimum audio signal is heard. The target coordinates are read off from the range counter, and the azimuth and elevation dials in meters and mils.

2. Characteristics:

- a. Type: Coherent doppler correlation radar.
- b. Weight: 15.9 lbs.
- c. Power: Battery 4520 (throw-away).
- d. Operator: 1 infantryman/operator.
- e. Transport:
 - (1) Manpack.
 - (2) Transit case.

3. References:

Operational Manuals (Contractor)
Maintenance Manuals (Contractor)



SIGFM/EL. 58-1875

FORT MONMOUTH, N. J

RADAR SET AN/TPS-25(XE-1) . (Service-Test)
Mfr. Hazeltine Electronic Div., Hazeltine Corp.
Close-up View . Interior of Shelter, Operating Position

U S ARMY SIGNAL RESEARCH AND DEVELOPMENT LABORATORY

Figure B-38. Radar set AN/TPS-25.

TAB 38

Radar Set, AN/TPS-25

1. Description and Use:

Primary mission is to detect, locate, and identify moving ground targets such as personnel and vehicles with sufficient accuracy to provide meaningful combat intelligence. Secondary mission is to locate targets with sufficient accuracy to permit accurate fire by crew-served weapons such as artillery, mortars, etc. The radar set is emplaced on the best available vantage point overlooking the terrain of interest. The antenna may be elevated up to 25 feet. The control-indicator unit (shelter mounted) can be located up to 225 feet from the receiver-transmitter/antenna unit, camouflaged for operator safety. The scan sector is set up to cover the area of interest, and the set is placed in search mode which automatically scans the sector in azimuth.

2. Characteristics:

- a. Type: Ground-to-ground, noncoherent, pulse-doppler, MTI radar.
- b. Weight: 2960 lbs (less trailer).
- c. Power Source: Gasoline Engine Generator PU-450/G 115 volts, 400 hertz, 3000 watts supplied with equipment.
- d. Crew: 8 men.
- e. Transport: Equipment packed in shelter, mounts in 1.5-ton trailer (M-105).

3. References:

- TM 11-5840-217-10 (Operator)
- TM 11-5840-217-35P
- TM 11-5840-217-20P



Figure B-39. ACOUSID.

TAB 39

Acoustic and Seismic Intrusion Detector, ACOUSID IH

1. Description and Use:

Seismic, with acoustic listening on command. It is aurally delivered at extended distances from the monitor site to detect traffic of vehicles or personnel.

2. Characteristics:

- a. Length: 53".
- b. Diameter: 3".
- c. Weight: 40 lbs.

3. References:

AMC STANO Catalog March 1970

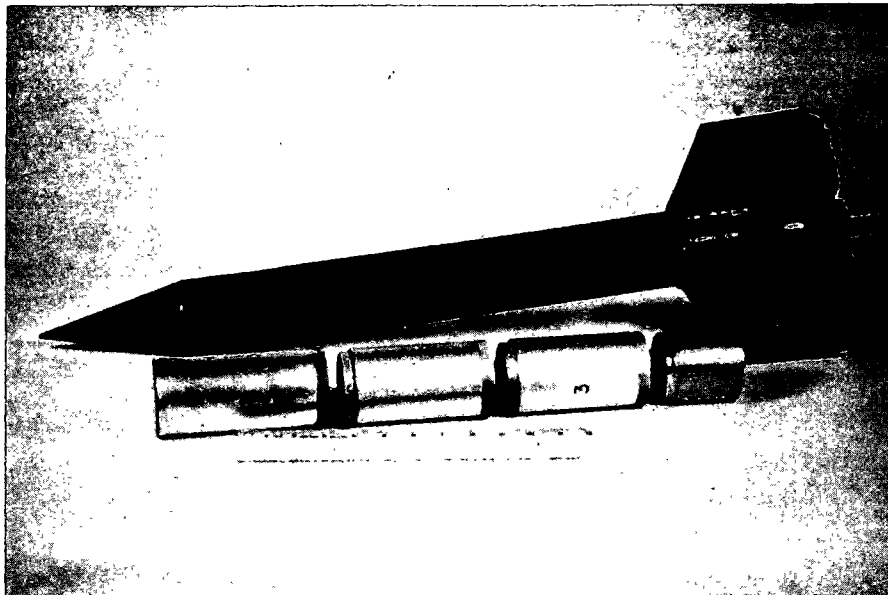


Figure B-40. ADSID.

TAB 40

Air-Delivered Seismic Intrusion Detector, ADSID III S**1. Description and Use:**

ADSID III is used with common modules, helicopter-launched, slow-speed aircraft-delivered, seismic sensor. The device is deployed at extended distances from the monitor site to detect traffic of vehicles or personnel.

2. Characteristics:

- a. Length: 20".
- b. Diameter: 3".
- c. Weight: 27 lbs.

3. References:

AMC STANO Catalog March 1970

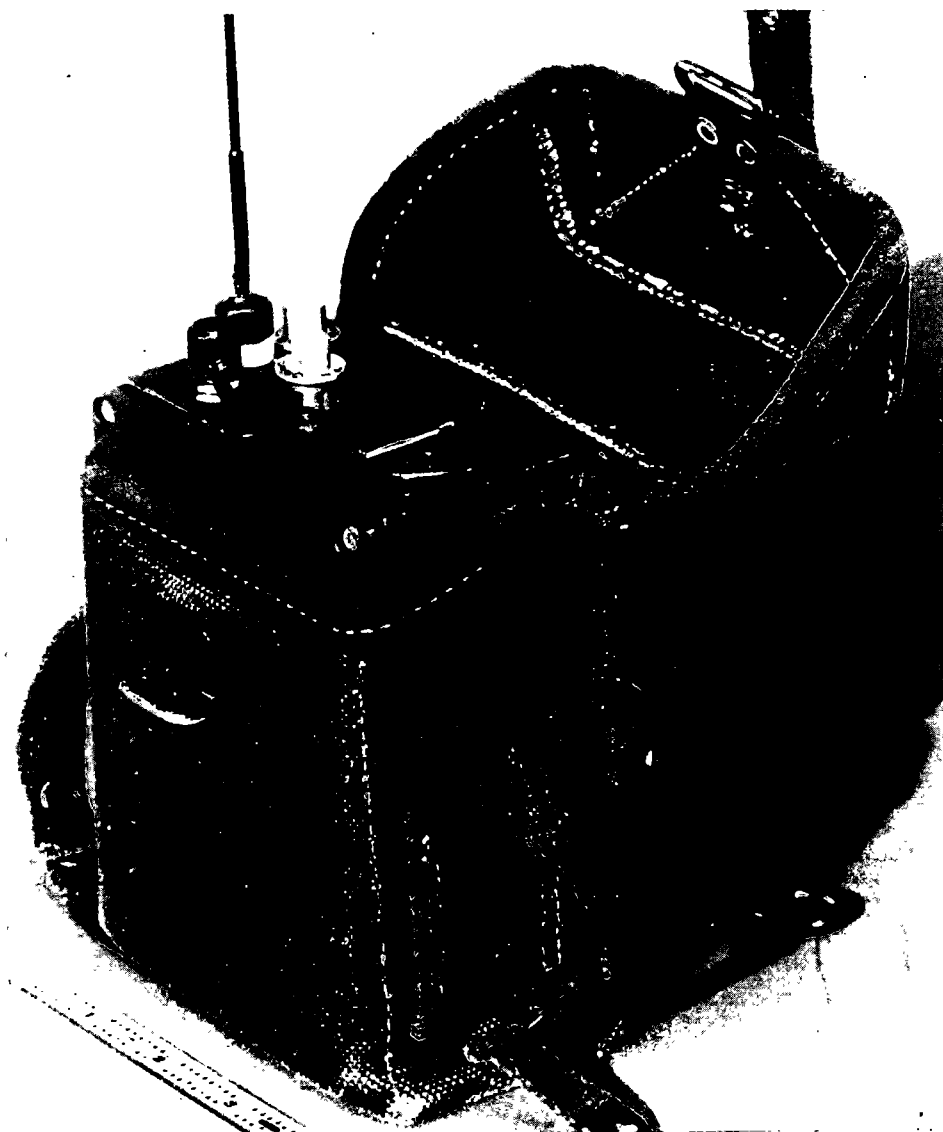


Figure B-41. MICROSID.

TAB 41

Alarm Set, Anti-Intrusion, Restricted Area, AN/GSO-() (MICROSID)**1. Description and Use:**

MICROSID is designed for detection of intruders, such as moving vehicles and personnel, with sufficient accuracy to produce meaningful combat intelligence. The device is small and light enough to be easily transported and utilized by infantry personnel. MICROSID processes local seismic information, decides when intrusion criteria are met, and transmits a radio identification signal to a remote receiver.

2. Characteristics:

- a.* Type: Seismic detection, hand emplace.
- b.* Weight: 4.8 lbs.
- c.* Power Source: Self-contained batteries, 28 vdc, 6.3 vdc, and 8 vdc.
- d.* Recoverability: Yes.
- e.* Type of Monitoring: Airborne or ground-stationed radio receivers.

3. Reference:

AMC STANO Catalog March 1970

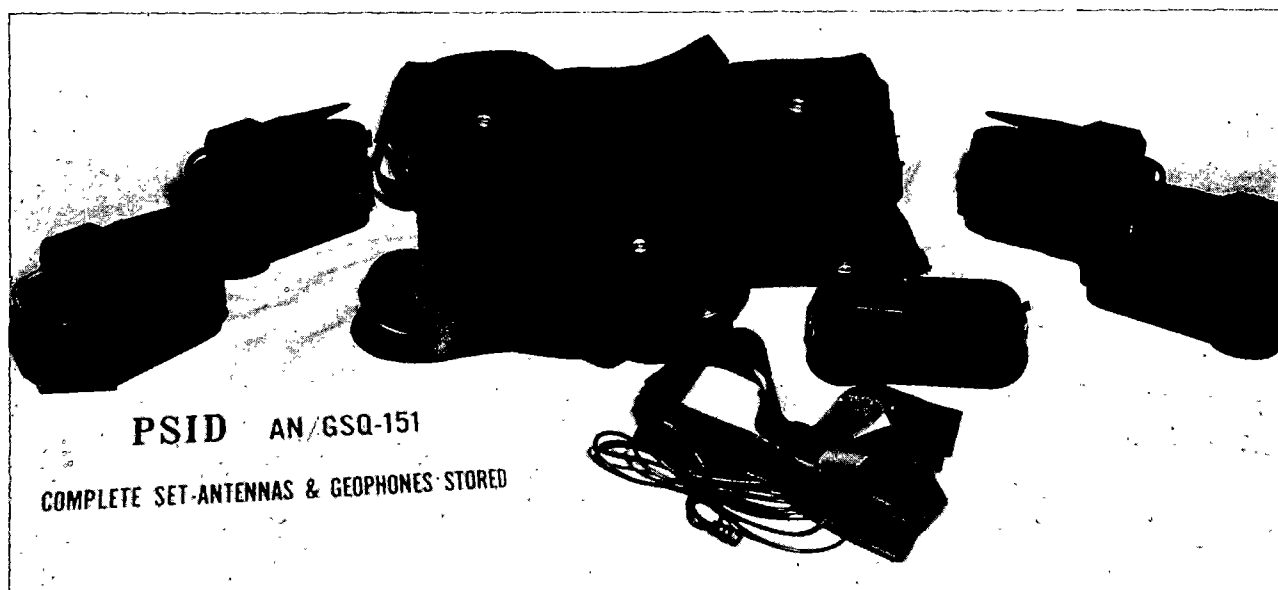


Figure B-42. AN/GSQ-151 PSID.

TAB 42

AN/GSQ-151, Alarm Set, Anti-Intrusion, Restricted Area (PSID)**1. Description and Use:**

The PSID is a self-contained, hand-emplanted sensor that detects the presence of seismic disturbance. The disturbances processed through a band-pass amplifier are usually disturbances caused by personnel or moving vehicles. The PSID set is designed for patrol level deployment and to be expendable. Each detector/transmitter, when disturbed, emits a simple tone-coded rf signal.

2. Characteristics:

- a.* Type: Seismic detection.
- b.* Weight: 7 lbs per set, including spare batteries and bag.
- c.* Power Source: Self-contained batteries, 9 volt dc. Designed for 2 days operation. Detectors have up to 30 day capability.
- d.* Recoverability: Yes.
- e.* Type of Monitoring: Set contains PSID receiver with headset.

3. Reference:

TM 113A-68-511

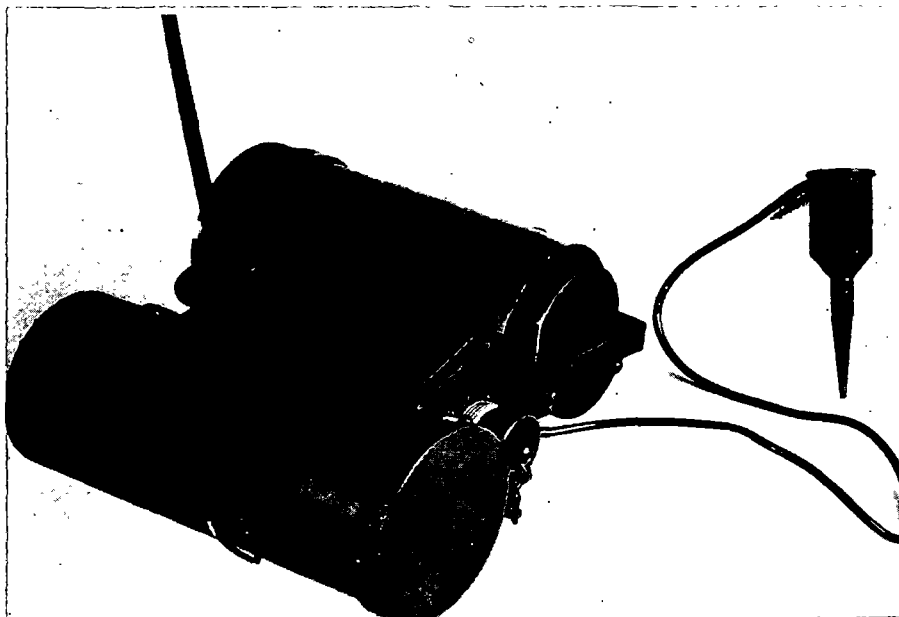


Figure B-43. MINISID.

TAB 43

Alarm Set, Anti-Intrusion, Restricted Area, AN/GSQ-154 (MINISID) AN/GSQ-155 (MINISID)**1. Description and Use:**

The MINISID is a self-contained, hand-emplanted sensor that detects the presence of seismic disturbances and performs a signal signature analysis in order to isolate those disturbances that are caused by moving vehicles or personnel. When a disturbance is detected, an RF transmitter is activated that emits an identification code which identifies the specific MINISID that sensed the disturbance.

2. Characteristics:

- a. Type: Seismic detection, hand emplaced.
- b. Weight: Maximum 10 lbs.
- c. Power Source: Self-contained battery, 28 vdc.
- d. Recoverability: Yes.
- e. Type of Monitoring: Airborne or ground receiver.

3. Reference:

AMC STANO Catalog March 1970



MC-64-426

Figure B-44. AN/GSS-9 breakwire device.

TAB 44

Alarm Set, Anti-Intrusion, Restricted Area, AN/GSS-9**1. Description and Use:**

The device is used by Special Forces and Infantry elements in conjunction with guerillan and counterguerilla operation to provide protective surveillance by means of either an audio or visual indication when an intruder breaks a size 44, AWG breakwire in a carefully-laid ground pattern. The breakwire is laid out in a desired ground pattern by looping around branches and/or trees. The control box is then monitored by the operator who selects either an audio or visual alarm or both. When an intruder breaks the wire, the alarm is activated. The level of employment is determined by the ground pattern desired.

2. Characteristics:

- a. Case: $11\frac{1}{2}'' \times 2\frac{3}{4}'' \times 3\frac{1}{2}''$.
- b. Weight: 8 ounces.
- c. Breakwire Vial: 2500 yards, 2-conductor, 44 AWG wire.
- d. Power Source: One BA-30 battery.

3. Reference:

AMC STANO Catalog March 1970

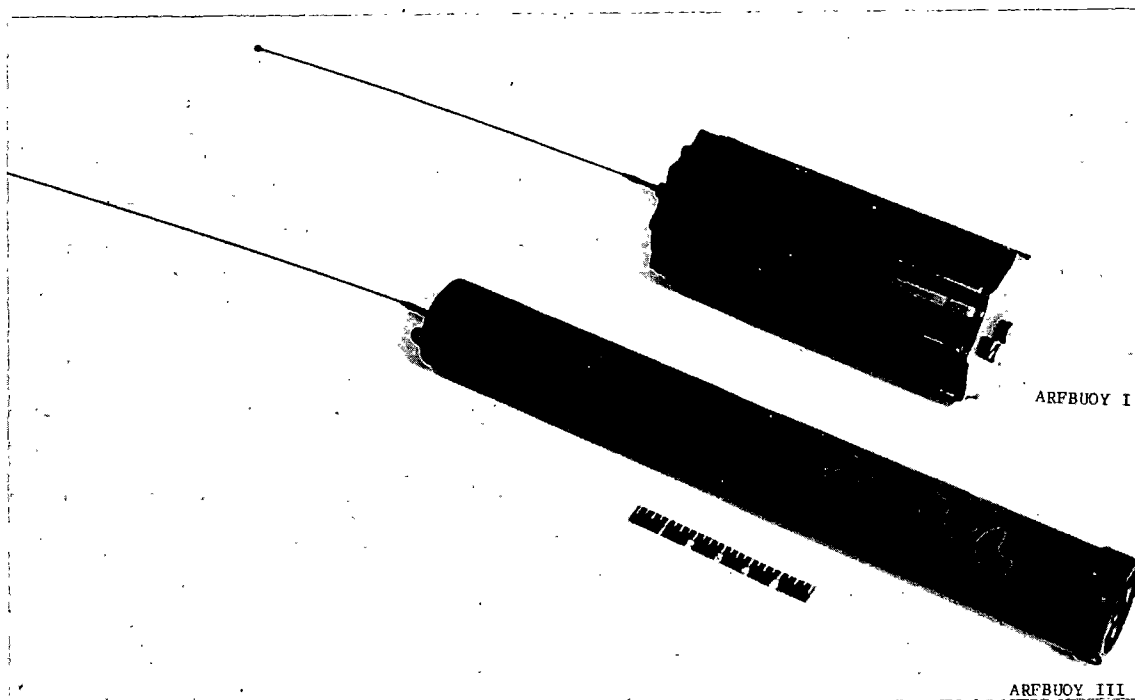


Figure B-45. ARFBUOY

TAB 45

Automatic Radio Frequency Buoy, ARFBUOY**1. Description and Use:**

ARFBUOY is designed to relay alarm signals generated by Noiseless Button Bomblets (NBB) pursuant to detection of intruders along paths, trails, and avenues of approach. The signals received from NBB are processed through a logic system to determine if intrusion detection is met. After processing, the transmitter is activated and a code pulse is transmitted to a central monitoring location. It is intended to provide realtime intelligence data on intruder movement to allow conventional confrontation or monitoring.

2. Characteristics:

a. The ARFBUOY is a 24-inch long cylinder, 3 inches in diameter plus the added height of an external antenna. It is hand emplaced, but can be adapted to be delivered by helicopter or by conventional or high performance aircraft. It weighs 14 pounds.

b. Upon receiving signal (alarm) the ARFBUOY logic system processes the information and determines if alarm criteria are met. When alarm criteria are met, a coded pulse is transmitted to a distant monitor display device.

3. Reference:

AMC STANO Catalog March 1970

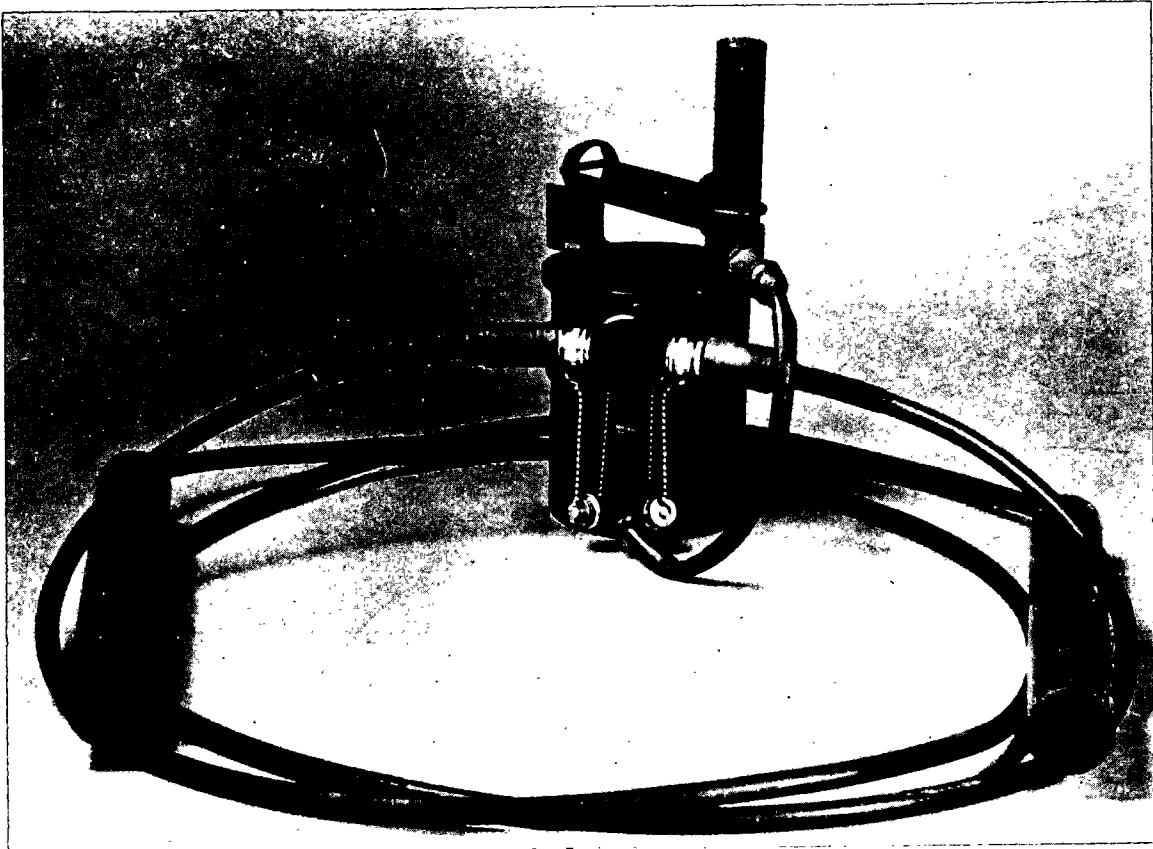


Figure B-46. MAGID.

TAB 46

Detector, Anti-Intrusion, MAGIS, DT-368/GSQ

1. Description and Use:

This is a magnetic detection device that is slaved to another sensor to increase their capability of detecting metallic objects passing over or near the sensing elements and to produce an alarm against ground intruders, such as personnel carrying weapons or other metal objects. It operates with sufficient accuracy to produce meaningful combat intelligence so either a mobile security force can be dispatched to, or supporting artillery fire directed on the violated area.

2. Characteristics:

- a. Type: Magnetic intrusion detector.
- b. Weight: Approximately 20 lbs.
- c. Dimensions: Sensors 1.8 inches in diameter, 14 inches long. Pickup unit, 5 inches in diameter, 8 inches long.
- d. Power Source: One self-contained battery providing four voltages, 5.75, 6.75, 8.10, and 9.45 volts, capable to operating 120 days without battery replacement.
- e. Components: 1 detector pickup unit, 2 sensor solenoids with cables, 1 antenna, 1 earth auger with canvas bag, 1 ground cloth 18 inches square.
- f. Recoverability: Yes.

3. Reference:

AMC STANO Catalog March 1970

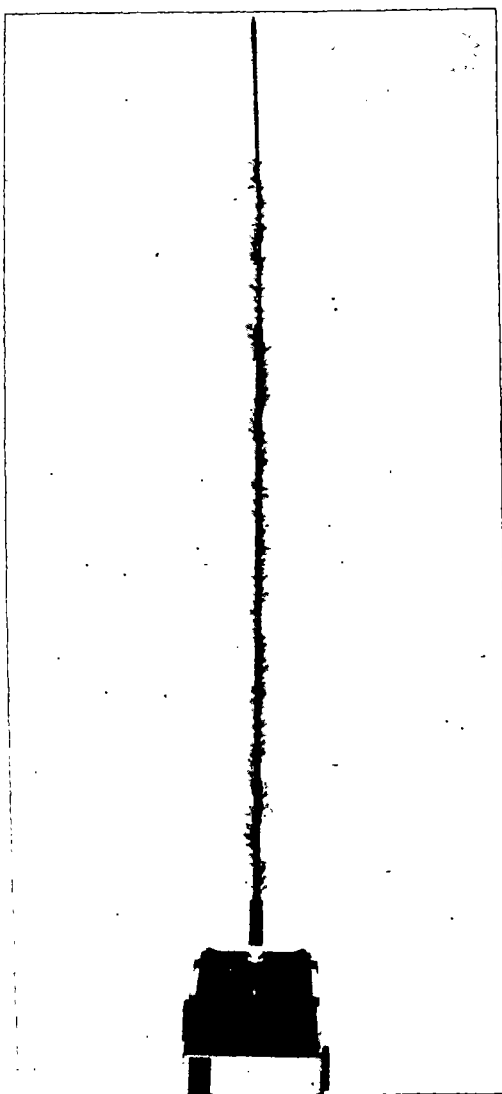


Figure B-47. EMID.

TAB 47

Electromagnetic Intrusion Detector

1. Description and Use:

Primary mission is to detect the movement of personnel, powered and unpowered small boats, and vehicles with very low false alarm rates. EMID is hand emplaced along roads, trails, or waterways to detect the movement of men and materiel.

2. Characteristics:

- a. Size: .2-cubic foot.
- b. Weight: 10 lbs.
- c. Power Source: 8-volt battery consisting of 1450 mercury cells.
- d. Output Power: 2 to 4 watts.

3. Reference:

AMC STANO Catalog March 1970

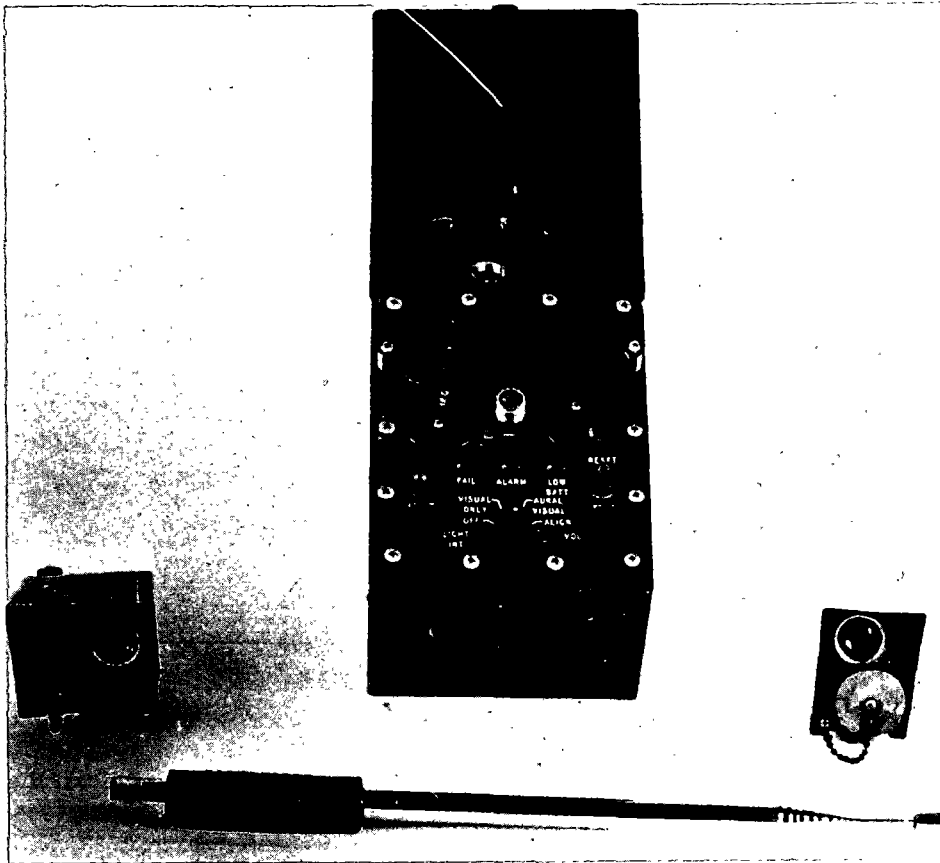


Figure B-48. IMID.

TAB 48

Infrared Miniaturized Intrusion Detector (IMID)**1. Description and Use:**

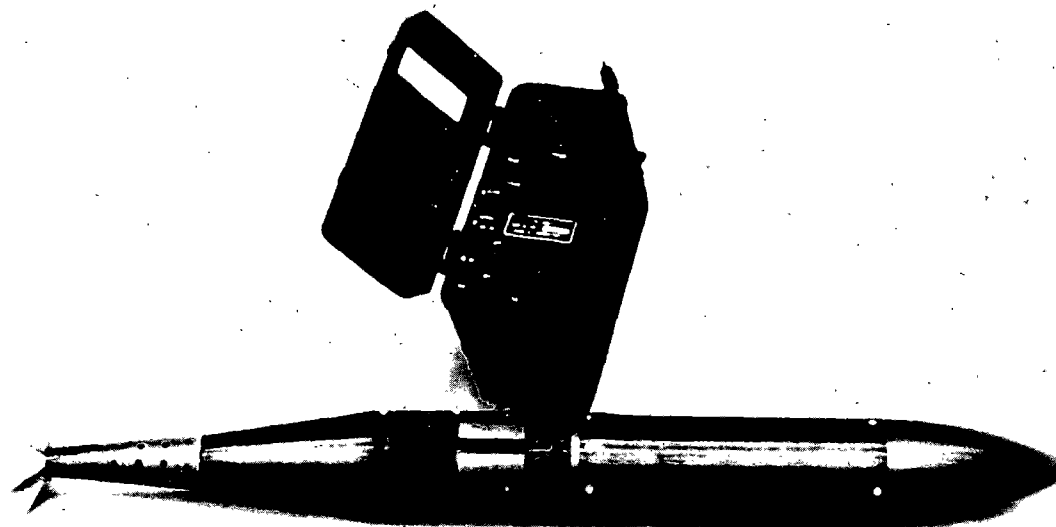
To develop a quick-setup, IR detector for detecting guerrilla movements and infiltrations across paths, perimeters, and other selected sites; for use in combat, storage, depot, and other security applications.

2. Characteristics:

An IMID set consists of an IR source, a combination IR sensor transmitter, and a single-channel annunciator. The IR source projects a pulsed beam of IR energy to the IR sensor transmitter. When the beam is interrupted by an intruder, the interruption is sensed by the IR sensor which in turn triggers the transmitter. The transmitter then sends coded pulses to an annunciator, where aural and visual alarms indicate that an intrusion has occurred. One man is required to emplace and operate the IMID.

3. Reference:

AMC STANO Catalog March 1970



MORTAR DELIVERED SENSOR
[81 MM]

Figure B-49. MODS.

TAB 49

Mortar Delivered Sensor (MODS) (AN/GSQ-136)

1. Description and Use:

A mortar delivered device. To detect movement of ground intruders (personnel and vehicles) and produce an alarm. Detection and alarm provide combat intelligence to allow dispatch of troops to investigate alarms, to deliver artillery, or to accumulate data on intruder movement without his knowledge of being detected.

2. Characteristics:

- a. Size: 31" long $\times$ 3" diameter, weight 9.4 lbs (less tail fins).
- b. Alarm: RF signal.
- c. Delivered by 81mm mortar (85).
- d. Seismic sensor.

3. Reference:

AMC STANO Catalog March 1970

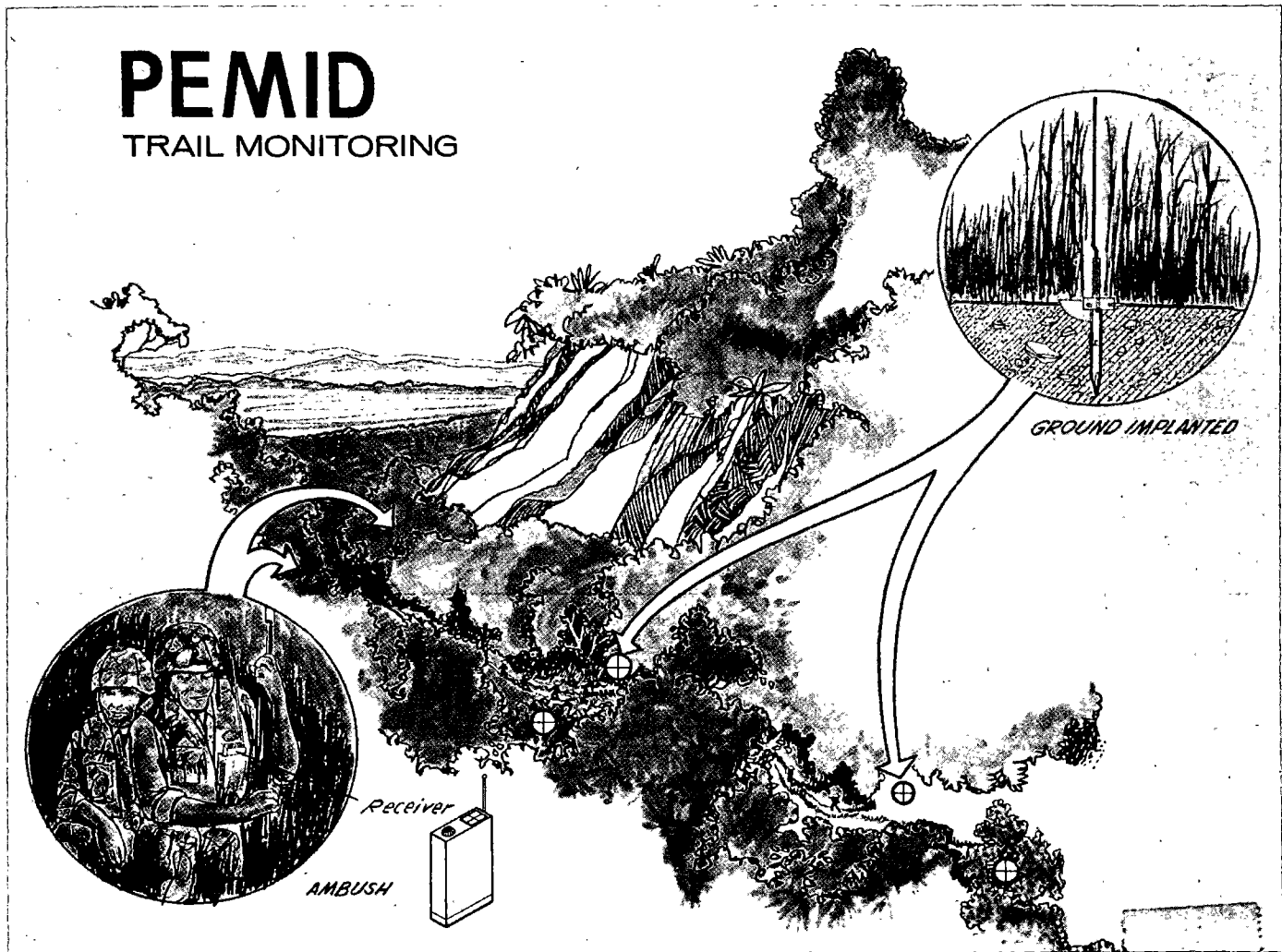


Figure B-50. PEMID.

TAB 50

Patrol Electromagnetic Intrusion Device, PEMID

1. Description and Use:

The PEMID is designed for use by patrols to detect intrusion of personnel, vehicles, and watercraft. This detection provides battlefield or live sensor intelligence data on intruder movement without his knowledge of being detected.

2. Characteristics:

- a. Weight and Size : Not available.
- b. Mode Electromagnetic.

3. Reference:

AMC STANO Catalog March 1970

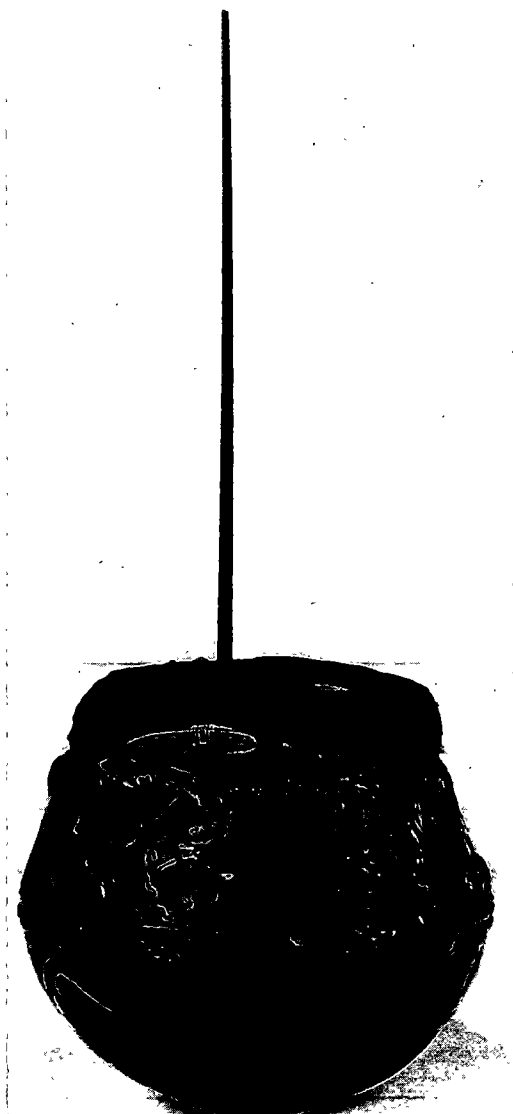


Figure B-51. SOSID.

TAB 51

Self-Orienting Seismic Intrusion Detector (SOSID)

1. Description and Use:

The SOSID is a self-contained, seismic intrusion detector capable of detecting seismic disturbance, and performing signal signature analysis in order to isolate those disturbances that are caused by moving vehicles or personnel. The SOSID will be hand launched, and is designed to withstand the impact associated with jungle terrain and hard ground. The electronics assembly, including geophone, firing mechanism, antenna is predeployed. Safety devices prevent accidental firing of the geophone mechanism.

2. Characteristics:

- a. Weight : 17 lbs.
- b. Power : 28 volt battery.
- c. Mode : Seismic.

3. References:

AMC STANO Catalog March 1970

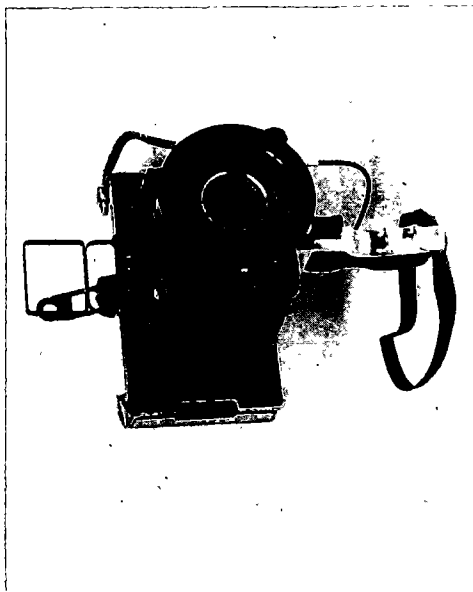


Figure B-52. KS-100 handheld camera.

3051

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TAB 52

KS-100 Handheld, Still Picture Camera

1. Description and Use:

A device to provide a quick-response, realtime, aerial reconnaissance photography capability for nonsurveillance type military aircraft observers. It will provide intelligence spot reports and other related military information.

2. Characteristics:

- a. Focal Length: 150mm.
- b. Focus: Fixed.
- c. Film: Polaroid types black and white and color film pack.
- d. Camera Dimensions: $8'' \times 7\frac{1}{2}'' \times 4\frac{3}{4}''$ approximately.
- e. Camera Weight: Approximately $4\frac{1}{2}$ lb.
- f. Special Features:
 - (1) Pistol grip for holding and sighting.
 - (2) Fold-down range finder.
 - (3) Carrying case.
 - (4) Safety straps.

3. References:

AMC STANO Catalog March 1970

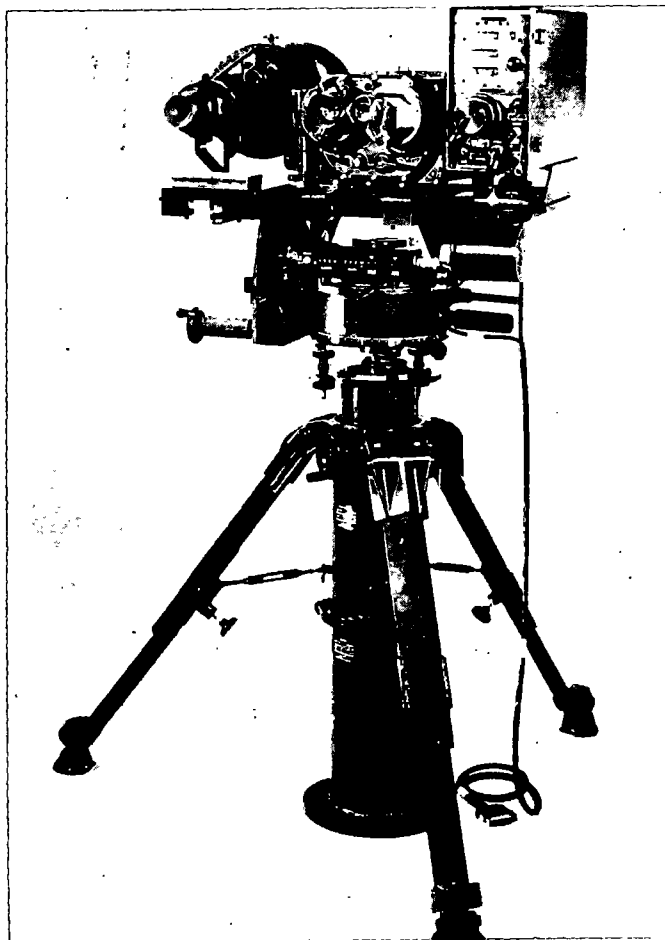


Figure B-53. AN/GVQ-10 observation system, integrated.

TAB 53

Observation System, Integrated AN/GVQ-10

1. Description and Use:

The purpose of the Integrated Observation System (IOS) (formerly IOD) is to accurately locate targets under day/night operation. The IOS consists of a precision optical equipment mount which provides digital azimuth and elevation readouts. A Laser Rangefinder is mounted on the LOS platform and boresighted.

2. Characteristics:

System consists of the following:

- a. Long Range Laser Range Finder AN/UVS-2—characteristics classified.
- b. Medium Range Night Observation Device AN/TVS-4—characteristics classified.
- c. Kollmorgen Binocular (modified)—characteristics classified.

3. Reference:

AMC STANO Catalog March 1970



Figure B-54. Antioscillation sighting system XM76.

TAB 54

Sighting System, Antioscillation XM76

1. Description and Use:

A stabilized hand-held optical image device to extend the user's capability for area surveillance, detection, and resolution of targets for Army aircraft. Used in an identical manner as binoculars with the added advantage of low power magnification, wide field of view with a reference reticle for centering the scene and zooming to high power magnification, narrow field. Image stabilization is available at all magnification.

2. Characteristics:

a. Weight: Hand-held unit—4.25 lbs, control module—5.5 lbs.

b. Power Source: 28 vdc.

c. Size:

(1) Hand-Held Unit: 9" long (1— $\frac{3}{4}$ " w/eyepiece), 6 $\frac{1}{2}$ " wide, 5 $\frac{1}{4}$ " high.

(2) Control Module: 7 $\frac{3}{4}$ " long (incl handle), 6" wide, 6 $\frac{1}{2}$ " high.

d. Magnification: 1.5 to 12 power zoom (2-speed button control).

e. Field of View: 34 degrees at 1.5X, 4.3 degrees at 11.5X.

3. Reference:

AMC STANO Catalog March 1970



Figure B-55. Portatile AN/USQ-46.

TAB 55

Radio Frequency Monitor Set, AN/USQ-46 (PORTATALE III)

1. Description and Use:

The AN/USQ-46 is a portable receiver designed to receive, decode, and display unattended ground sensor identification and audio transmissions. Secondary purpose is to provide signal data and power to ancillary display devices. Ground forces can operate from a line-of-sight vantage point or any other designated location. Powered by either a battery or an external power source, it can be operated as a single monitoring device in such a location as an observation post or it may be included as part of a terminal configuration of monitoring and display equipment in a sensor system providing data to an operations center or a fire support and coordinations facility. The AN/USQ-46 may be employed in much the same manner as the AN/USQ-42, its predecessor.

2. Characteristics:

- a. Size: 4" × 12" × 10 $\frac{1}{4}$ "
- b. Weight: 17 $\frac{1}{2}$ lbs w/battery.
- c. Power Source: BA-386/BA-4386 or detachable power supply which accepts 105-125 vac (50-400 cps) or 22-23 vdc inputs.
- d. Alarm:
 - (1) Audio: Provides headset output of received audio signals.
 - (2) Visual: 64-light display.
- e. Capacity: Approximately 15 operating sensors per channel.
- f. Crew: 1 operator.
- g. Transport: Manpack, vehicle, or helicopter.

3. Reference:

AMC STANO Catalog March 1970

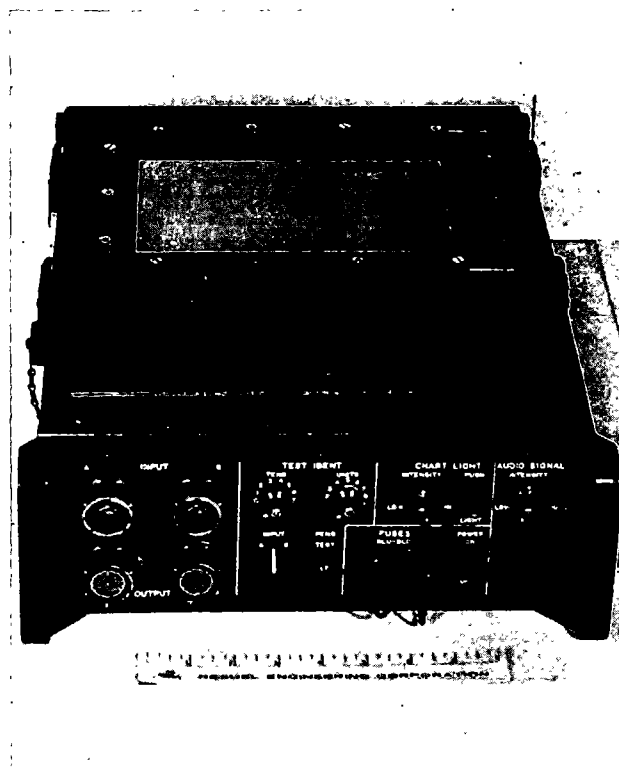


Figure B-56. Recorder signal data RO-376.

TAB 56

Recorder, Signal Data RO-376/USQ

1. Description and Use:

As an ancillary item to the Radio Frequency Monitor Set AN/USQ-46, the primary mission of the equipment is to provide, in chart form, a permanent record of sensor activations as detected by the above RF monitor sets.

2. Characteristics:

- a. Size: 14" × 18" × 5".
- b. Weight: 20 lbs.
- c. Power Source: External 22-23 vdc.
- d. Chart Movement: 12"/hr.
- e. No. of Sensing Pens: 30.

3. Reference:

AMC STANO Catalog March 1970

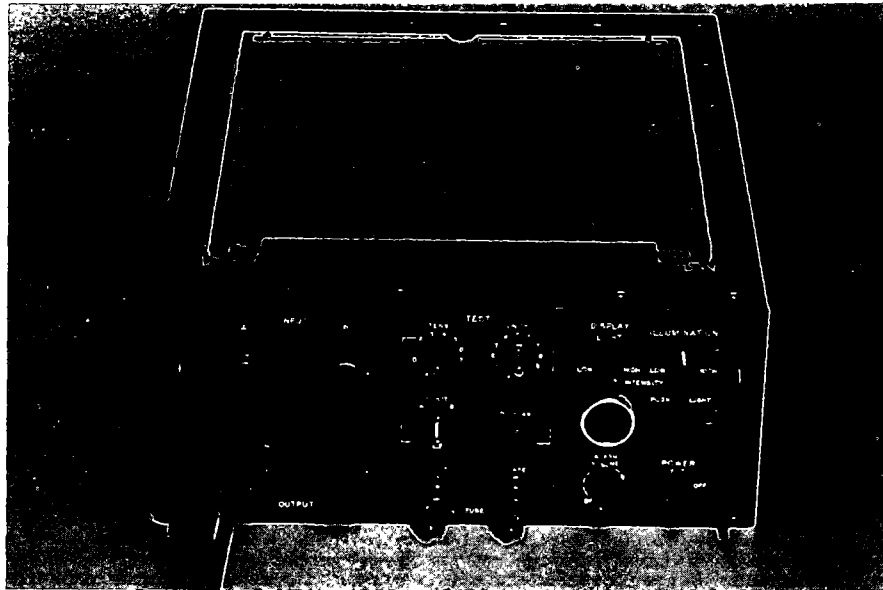


Figure B-57. Situation map display.

TAB 57

Situation (Map) Display

1. Description and Use:

As an ancillary item to the Radio Frequency Monitor Set AN/USQ-46, the primary mission of the equipment is to graphically display sensor activation in conjunction with actual sensor locations on an appropriate map of the target area. There are 30 adjustable lamps which are positioned behind a 12" $\times$ 12" map surface in accordance with actual sensor locations. Each time a valid sensor activation message is received by the RF monitor set, the corresponding lamp behind the map surface is illuminated.

2. Characteristics:

- a. Size: 14" $\times$ 18" $\times$ 5".
- b. Weight: 18 lbs.
- c. Power Source: External, 22-23 vdc.
- d. Lamp-on Time: 5-15 sec.
- e. Display: 30 adjustable lamps.
- f. Scale: 1:50000 or 12" $\times$ 12" map section.

3. Reference:

AMC STANO Catalog March 1970

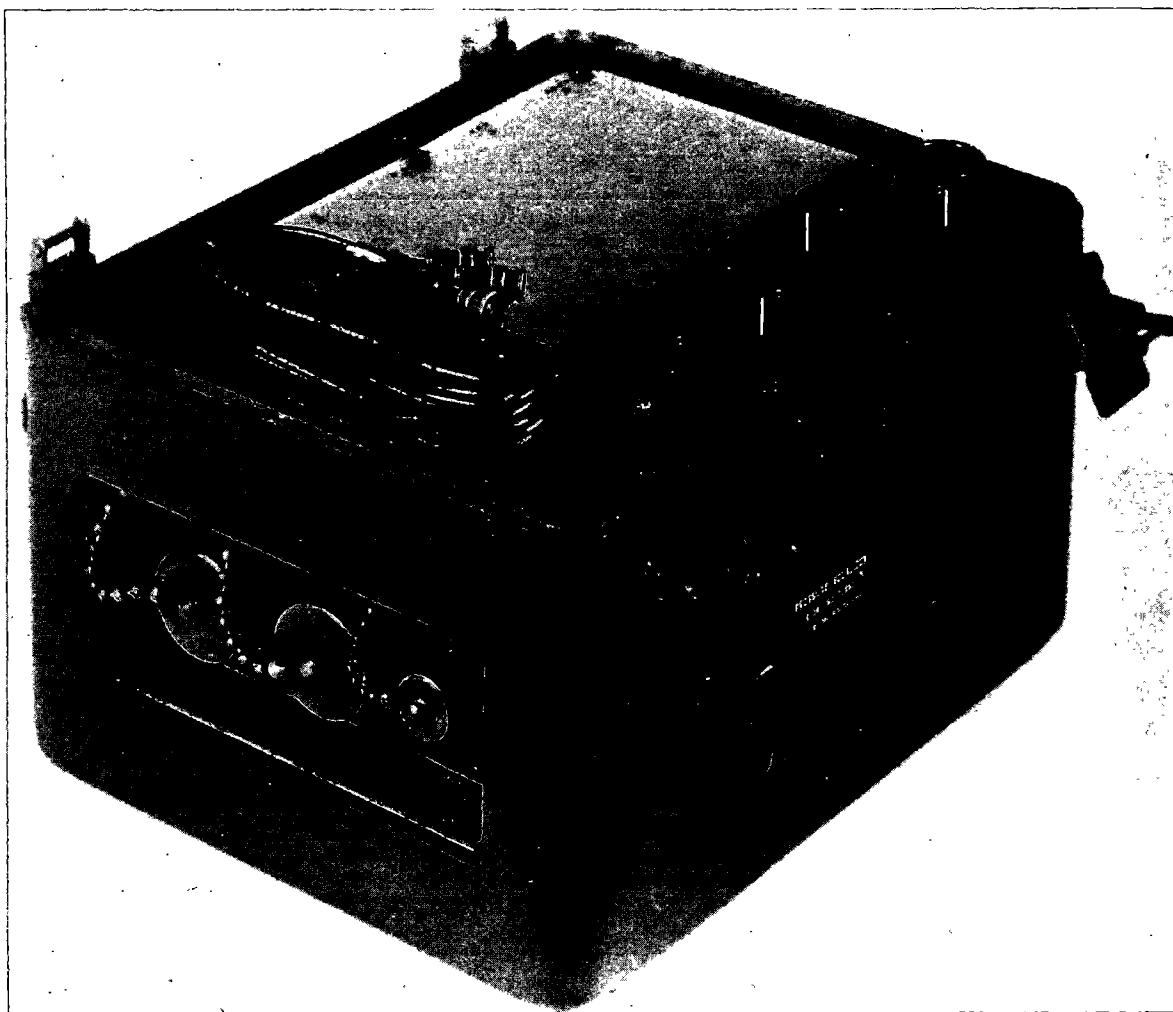


Figure B-58. Multiple address PSID receiver.

TAB 58

Multiple Address PSID Receiver (MAPR)**1. Description and Use:**

The MAPR is a device which will allow one to six PSID sets to be monitored simultaneously, thereby providing a 24 detector monitoring capability. The PSID receivers are connected by cable to the MAPR, which by means of display lights indicates sensor activations. The display is a 4 by 6 matrix of lights. Use of the MAPR is anticipated by lower echelon troops (platoon, company and battalion) for purposes of expanding the role of the PSID in special situations, such as base perimeter ambush and similar applications.

2. Characteristics:

- a. Weight: approximately 7 pounds.
- b. Size: $8 \times 10 \times 7$ inches.
- c. Power: BA-30 batteries.
- d. Capability: monitor up to six PSID receivers simultaneously.

3. Reference:

AMC STANO Catalog March 1970



APPENDIX C

EXAMPLE OF SURVEILLANCE AND TARGET ACQUISITION ANNEX TO DIVISION OPERATION ORDER

(CLASSIFICATION)

ANNEX J (STANO) to OPORD 6-20th Inf Div
Reference: Map, Series_____, Editions 1-AMJ, 1:50,000.
Time Zones Used Throughout the Order: _____

1. SITUATION.

a. Enemy Forces.

- (1) Annex A (Intelligence)
- (2) Enemy is capable of . . .

b. Friendly Forces.

- (1) 1st Corps attacks . . .
- (2) 9th TAF supports . . .
- (3) Annex B (Fire Support)

c. Attachments and Detachments. Attached effective _____

- (1) A Btry, 6th Bn (Tgt Aqn), 25th Arty
- (2) 2d Plt, A Co (Ranger), 75th Inf

2. MISSION.

Maintain a 24-hour all weather observation of the Division AO. Locate targets for employment of fire and maneuver elements of the Division.

3. EXECUTION.

a. Each brigade will be responsible for security and observation of its own area. OP/LP, restrictions on use of white light and other active emitters per Division SOP.

b. Resources.

- (1) 1st Sqdn, 23d Cav:

(a) Ground:

- Metascope
- Periscopes, electronic and optical
- Binoculars, electronic and optical
- Night observation devices, med range
- Radar
- Infrared viewers
- Unattended ground sensors and receiver/monitors
- Laser range finder
- Battle Area Surveillance System, Phase III (BASS III)

(CLASSIFICATION)

(CLASSIFICATION)

(b) Air:

Night Vision sights, indiv and crew served weapons
Metascopes
Binoculars, electronic and optical
Searchlights, ~~infrared~~ and visible light
Night fire control and observation systems employing
image intensification and thermal imaging techniques

(2) 120th Avn Bn:

Night vision sights (individual and crew served weapons)
Receivers/monitors for unattended ground sensors
Searchlights (infrared and visible light)
Night fire control and observation systems employing image
intensification and thermal imaging techniques

(3) 20th Inf Div Arty:

Radar
Infrared viewers
Night observation devices
Binoculars, electronic and optical
Battery cmdr scope
Laser range finder
Night vision sights (individual and crew served weapons)

(4) 162nd MI Bn (Cbt):

Radar
Night observation devices
Battery commander scope
Binoculars (electronic and optical)
Ground sensor terminals for both aerial infrared and radar
imagery

Laser range finders
Telescopes

(5) 1st Bn (C/V) (SP), 439th Arty:

Radar
Binoculars, electronic & optical
Night vision sights, indiv & crew served wpns

(6) Nondivisional:

- (a) MI specialists from 20th MI Co (Inf Div)
- (b) 6th Bn (Tgt Aqn), 25th Arty
- (c) 1st Plt, Btry A (Slt), 190th Arty
- (d) 2d Plt, Co A (Ranger), 75th Inf
- (e) 377th ASA Co (Inf Div)

c. 1st Bde:

(1) Be prepared to survey in Zone A (Annex B) (operations overlay)
to OPORD 6) for special requirement.

(2)

d. 2nd Bde:

(1) Survey routes Quebec and Romeo (Annex B (Operation overlay)
to OPORD 6) daily for evidence of enemy activity.

(2)

(CLASSIFICATION)

(CLASSIFICATION)

- e. 1st Sqdn Cav:
 - (1) Screen left and rear flanks of the division on a continuous basis.
 - (2) Be prepared to release one troop to the 1st Bde for special surveillance mission TBA.
- f. 120th Avn Bn:
 - (1) Annex D (Aviation) to OPORD 6.
 - (2) As directed by supported Bdes.
- g. Div Arty:
 - (1) Annex C (Fire Support) to OPORD 6.
 - (2) Appendix 3 (Tgt Aqn Plan).
- h. 162nd MI Bn (Cbt): Div SOP.
- i. 1st Bn (C/V) (SP), 439th Arty:
 - (1) 24-hr overhead surveillance in division AO.
 - (2) Acquire and engage targets IAW Div SOP.
- j. A Btry, 6th Bn (Tgt Aqn), 25th Arty: As directed by CO, 1st Bde.
- k. 2d Plt, A Co (Ranger), 75th Inf: As directed by CO, 2d Bde.
- l. Res: 3d Bde: OPORD 6.
- m. Coordinating Instructions:
 - (1) Task organization effective 222000 Aug.
 - (2) EEI: Is the enemy countering thermal imagery systems?
 - (3) Use of friendly devices as nav aids: Div SOP.
 - (4) FDC will approve all use of flares.
- n. Present rainy season attenuating signatures for use by thermal imagery devices.
- o. Surveillance countermeasures: Div SOP.
- p. Deception: As directed.

4. SERVICE SUPPORT.

- a. Div installations remain at present locations.
- b. Annex E (Service Support Overlay), OPORD 6.

5. COMMAND AND SIGNAL.

- a. Index 1-3, SOI.
- b. Annex H (Communications—Electronics), OPORD 6.

- Appendices: 1—Ground Surveillance Plan (omitted)
 2—Aerial Surveillance Plan (omitted)
 3—Target Acquisition Plan

APPENDIX 3 (Target Acquisition Plan) to ANNEX J (STANO) to OPORD 6—20th Inf Div.

(CLASSIFICATION)

(CLASSIFICATION)

Reference: Map, Series _____, Sheets _____, Edition _____.
1:50,000

Time zone used throughout the order: _____.

0-0 Line (300100)—(340060)—(380049)—(420023)

1. ZONES OF RESPONSIBILITY.

a. 1st Bn, 45th Artillery: Observation in 1st Bde zone, south (short) of 0-0 line.

b. 1st Bn, 45th Artillery: Observation in 2d Bde zone, south (short) of 0-0 line.

2. GROUND VISUAL OBSERVATION.

a. Observation Posts.

(1) Division Artillery: 20th Inf Div Arty SOP.

(2) 1st Sqdn, 23d Cav: As directed by sqdn cmdr.

b. Capability Chart: 20th Inf Div Arty NLT 210700 Aug 19__.

3. RADAR.

a. Special attention to areas indicated on Tab A to Appendix 3 (omitted).

b. Direct support battalions: As directed by CO, Div Arty.

c. Hq Btry, Div Arty: As directed by CO Div Arty.

d. 162d Mil Intell Bn (Cbt): As directed by supported infantry battalion commander.

4. AIR OBSERVATION.

a. Airfields and heliports.

(1) Div Main (321236).

(2) Hq, Div Arty (269287)

(3) Field Artillery Bns: Select and report by 210700 Aug 19__.

b. Surveillance Schedule.

(1) 120th Avn Bn: Minimum of one aircraft continually in division zone from BMNT — 15 minutes to EENT + 30 minutes.

(2) Hq Btry, Div Arty: As directed by CO, Div Arty.

TABS:

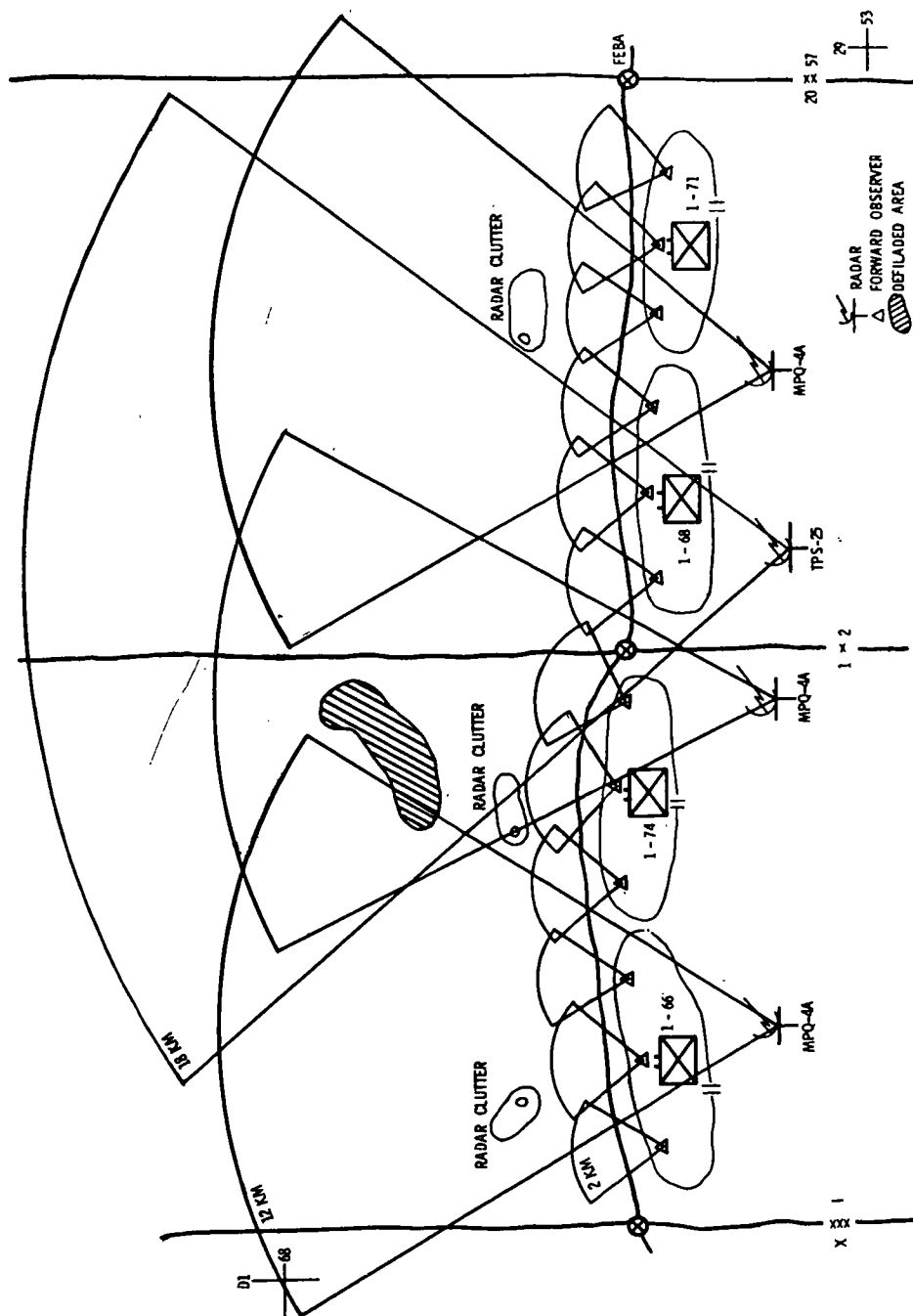
A. Overlay, Special Areas of Attention (omitted)

B. Division Artillery Capability Chart

(CLASSIFICATION)

(Classification)

TAB B (DIVARTY CAPABILITY) to APP 3 (TGT AQN) to
ANNEX J (STANO) to OPORD 6



(Classification)

TAB B Division Artillery Capability Chart



GLOSSARY

Active vision devices—An item of optical equipment which requires energy projected from a man-made source to provide an image to the user.

Aerial field artillery—A unit organized and employed using its organic aerial carriage and affixed weapons systems to accomplish the field artillery mission.

Anti-intrusion devices—Safeguards used to alert security personnel to an impending or attempted intrusion into a secured area.

Artificial illumination—Any man-made or man-generated illumination.

Attack helicopter—Army attack helicopters are used to engage enemy targets, reinforce and extend the fires of ground based weapons, provide direct aerial fire support to combat units, and to escort troop-carrying helicopters.

Battlefield Area Surveillance System Phase III (BASS III)—This system is built upon common modules and provides a wide-area surveillance capability to the concerned commander through the use of remote relays. It is capable of monitoring all unattended ground sensors within radio frequency range of its relay site, and of controlling/commanding those sensors equipped with a command receiver.

Communications intelligence (COMINT)—Technical and intelligence information derived from foreign communications by other than the intended recipients.

Communications security (COMSEC)—The protection resulting from all measures designed to deny to unauthorized persons information of value which might be derived from the possession and study of telecommunications, or to mislead unauthorized persons in their interpretations of the results of such study. Communications security includes cryptosecurity, physical security, and transmission security.

Deception—The deliberate radiation, reradiation, alteration, absorption, or reflection of electromagnetic radiations in a manner intended to mislead an enemy in the interpretation of data received by his electronic systems. There are two categories of deception—Manipulative and Imitative.

Electromagnetic support measures (ESM)—Is that division of EW involving actions taken to search for, intercept, locate, record, and analyze radiated electromagnetic energy for the purpose of exploiting such radiations in support of military operations. Thus, ESM provides a source of EW information required to conduct electronic counter-countermeasures (ECCM), threat detection, warning, avoidance, target acquisition, and homing.

Electronic countermeasures (ECM)—Is that division of EW involving actions taken to prevent or reduce an enemy's effective use of the electromagnetic spectrum. ECM includes jamming and deception.

Electronic counter-countermeasures (ECCM)—Is that division of EW involving actions taken to insure friendly effective use of the electromagnetic spectrum despite the enemy's use of EW.

Electronic intelligence (ELINT)—The intelligence information product resulting from the collection and processing, for subsequent intelligence purposes, of foreign noncommunications electromagnetic radiations emanating from other than nuclear detonations or radioactive sources.

Electronic jamming—The deliberate radiation, reradiation, or reflection of electromagnetic signals with the object of impairing the use of electronic devices, equipment, or systems being used by an enemy.

Electronic security (ELSEC)—The protection resulting from all measures designed to deny unauthorized persons information of value which might be derived from their intercept-

tion and study of friendly noncommunications electromagnetic radiations.

Electronic warfare (EW)—Is a military action involving the use of electromagnetic energy to determine, exploit, reduce, or prevent hostile use of the electromagnetic spectrum and action which retains friendly use of the electromagnetic spectrum. There are three divisions within EW (ESM, ECM, and ECCM).

Electronics—Signifies of or pertaining to devices, circuits or systems utilizing electron devices.

FLIR—Forward looking infrared.

GSR—Ground surveillance radar.

Heavy overcast conditions—Illumination on the order of 10^{-5} foot-candles.

HUMINT—Intelligence obtained from human factors.

Imitative deception—Introducing radiations into enemy channels which imitates his own emissions.

Indirect illumination—A type of battlefield illumination obtained by employing searchlights using diffusion or reflection techniques.

Infrared light source—The part of the invisible spectrum that is contiguous to the red end of the visible spectrum and that comprises electromagnetic radiations of wavelengths from 0.8 to 1000 microns.

Invisible illumination—Any illumination not visible to the unaided eye.

Line sensor—An unattended ground sensor designed to detect intruders crossing a linear trace and transmit an alarm to a manned position. Two methods of alarm transmission are provided: a "hard-wire" link connected to an annunciator and a "radio" link using a radio data set.

Line of observation and surveillance (LOS)—A line of positions established within the security echelon equipped with night operating aids to maintain observation and surveillance over the enemy during periods of limited visibility.

Moonlight conditions—Illumination on the order of 10^{-2} foot-candles.

Near Infrared—That portion of the electromag-

netic spectrum which is adjacent to or "near" the visible light portion. It includes that portion of the infrared spectrum from about .85 micron to 1.2 microns in wavelength; the lower limit being approximately that of visible light, the upper limit being that of the cutoff point for the near infrared photo-emissive surface presently available.

Pink light—That light which is emitted from approximately .6 to .8 microns in wavelength. Pink light is barely visible to the naked eye.

Pulse gated—The pulse gated system consists of an image intensifier viewer and a pulsed laser light source. The laser provides a very short discrete pulse of energy to illuminate the target and the image intensifier viewer simply amplifies the light reflected from the target. As the pulse of light is emitted from the laser, the viewer (receiver) closes down and, based on a known time constant, reopens to view only the light reflected from the target area. In essence, the viewer ignores all intermediate light returns from fog, haze, foliage or similar reflectors and thereby provides a degree of penetration. Since the time constant can be optionally controlled by varying the synchronization between the laser and viewer, the device is capable of ranging on a target area.

Signal intelligence (SIGINT)—A generic term encompassing communications intelligence (COMINT) and electronic intelligence (ELINT).

Signal security (SIGSEC)—A generic term encompassing communications security (COMSEC) and electronics security (ELSEC).

Starlight conditions—Illumination on the order of 10^{-4} foot-candles.

STANO—An acronym for surveillance, target acquisition and night observation. It is comprised of those means and materiel organic to or in support of the Army in the field (to include other services) associated with information-gathering and presentation capabilities utilized to find the enemy or facilitate night operations.

Sensor—A technical means to extend man's natural senses; an equipment which detects and indicates terrain configuration, the presence

of military targets, and other natural and manmade objects and activities by means of energy emitted or reflected by such targets or objects. The energy may be nuclear, electro-

magnetic, including the visible and invisible portions of the spectrum, chemical, biological, thermal, or mechanical, including sound, diast, and earth vibration.



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FM 31-100 (TEST)

By Order of the Secretary of the Army:

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